Heating and Ventilating

For Engineers and Contractors Controlling the Design, Specification, Installation and Maintenance of Heating, Ventilating and Air Conditioning

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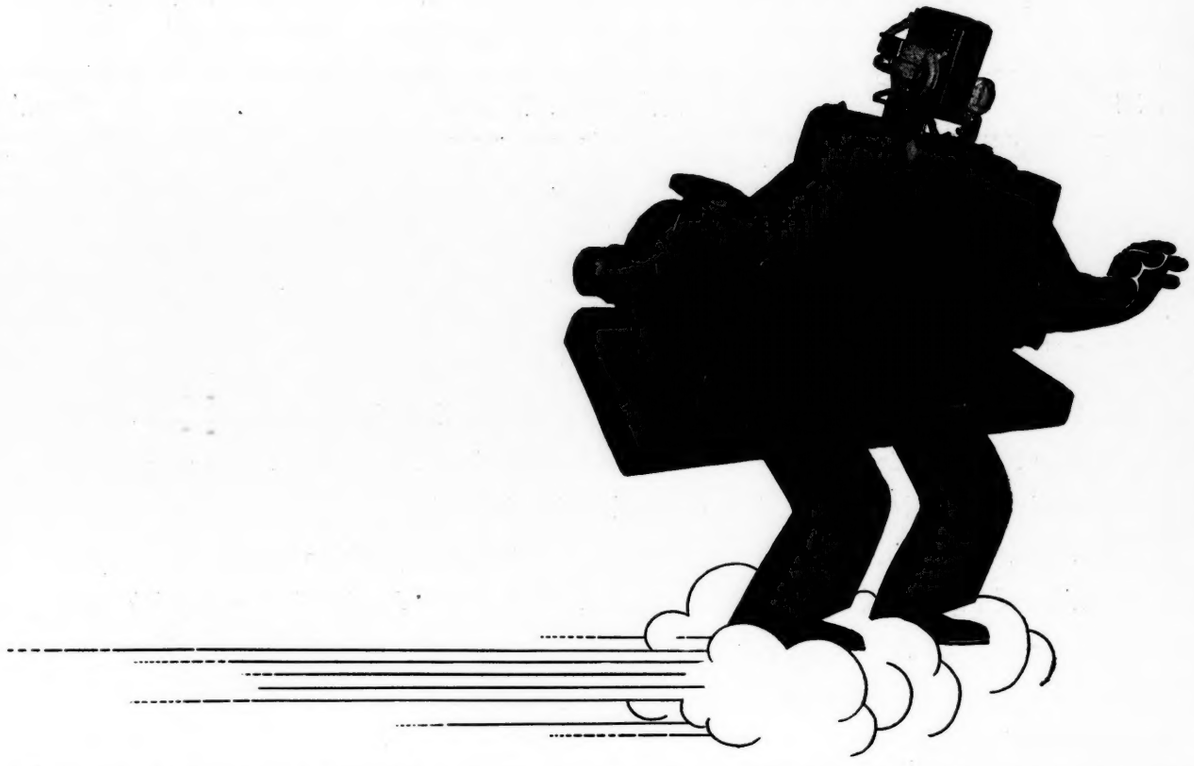
THIS NEW KIND OF HEATING PUMP GOES SILENTLY ABOUT ITS JOB



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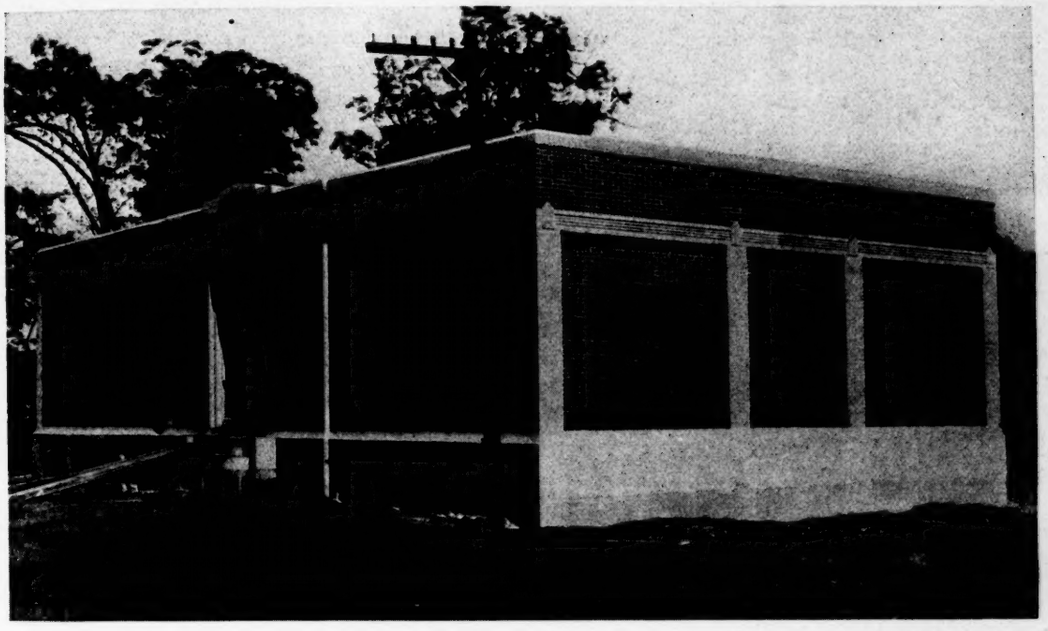
Air Conditioning Makes Possible a Windowless Small Office Building



Windowless office building of Wallingford Steel Company. Building has no windows except small lookout at right of entrance.

WINDOWLESS buildings are not a new development in the construction field, having been tried out over a period of years, but they have been designed mainly for industrial uses. One of the first office buildings to embody this principle has just been completed by the Wallingford Steel Co., Wallingford, Conn.

The steel company decided upon the windowless type of construction for its new office building largely because of the fact that the plant is located on a broad sand plain, and the sand, carried in clouds by every breeze, makes open windows a decidedly uncomfortable method of ventilation. Air conditioning naturally plays a major part in the project, which, in fact, would have been impossible without it.

Another important factor in the case is the tendency of boys in the neighborhood of the plant to test their stone-throwing accuracy on factory windows. The new office building will afford no target for them, and glaziers' bills for replacement of shattered panes will no longer provide a constant headache.

The old offices, located in a section of the plant which is devoted to the manufacture of cold rolled steel, were noisy at all seasons, crowded for lack of space, and a veritable furnace in the summer months. Office workers had their choice of opening the windows and being inundated by flying sand and dust, or leaving them closed and being suffocated by heat.

Last spring, officials of the company supervised the drafting of plans for a one-story brick building, 37 ft. x 66 ft. in plan, to be erected near the outer entrance of the plant yard, at a distance from the main mill. Construction was started late in June and was completed in October.

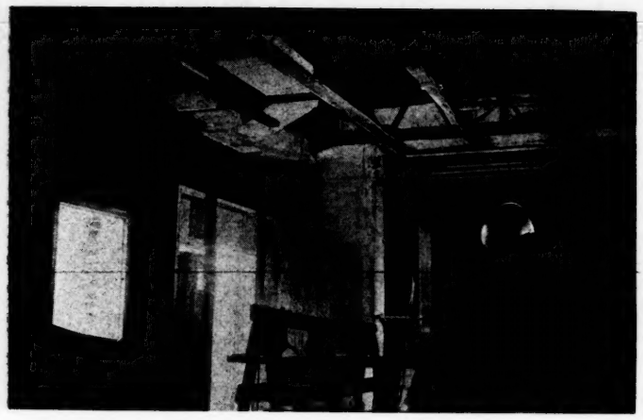
The entire structure was designed on scientific principles with a view to providing maximum insulation. The floor is of solid steel, battleship deck type, covered with a $\frac{3}{8}$-in. plastic coating and surfaced with asphalt tile. The roof is also of steel, with two 1-in. layers of board insulation, plus several layers of roofing felt and a top surfacing of roofing asphalt.

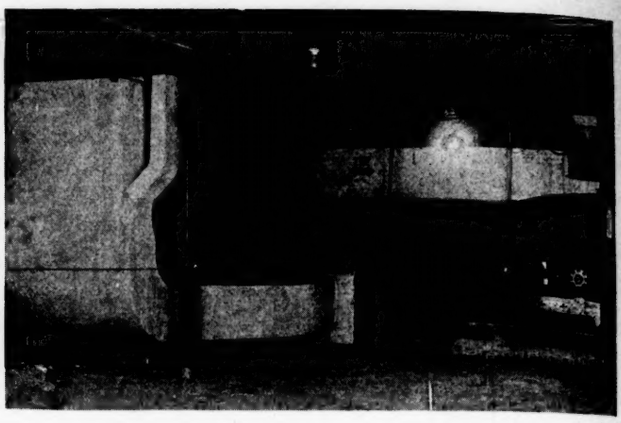
The brick sidewalls were first asphalted on the inside, after which 1-in. furring strips were attached, running the full height. Up to the chair-rail, 36 in. above the floor, sheetrock was applied, while the remainder of the wall, up to the ceiling, was surfaced with matched fibre board. Acoustic material is used on the ceiling, and additional ceiling insulation is furnished by a 4-in. layer of rockwool.

There is very little wood in the building, all office partitions being of steel and glass, while the front door and rear emergency door and even the company's name sign are of stainless steel. Asbestos tile is used for decoration.

The building has but one window, that being a small pane, 2 ft. x 3 ft. in dimensions, placed beside the front door and intended for use as a lookout by the gate operator who will have control of an automatic gate giving access to the plant grounds. The lookout window is sealed, with double glass enclosing a 6-in. air space.

Conditioned air is supplied by a central station system with distributing ducts, all mechanical apparatus being located in the basement. It is a complete all-year-round system, designed to cool and dehumidify in summer and heat and humidify in winter. Ventilation at all times with filtered air is an important feature.





(Left) Main duct which supplies conditioned air to offices. The window, near the front door, is the only one in the building and is used as a lookout. (Right) Air conditioning equipment located in basement of building. Main supply duct is at left, outside intake at rear, return ducts at right.

The basis of design is as follows:

	Outside	Inside
Summer	95 dry bulb 75 wet bulb	80 dry bulb and 50% relative humidity
Winter .....—10 dry bulb		70 dry bulb and 35% relative humidity

Conditioning Equipment

The cooling and dehumidifying equipment consists of two 3-hp. compressors using freon, each connected to a wet expansion evaporator. Control is accomplished by a thermostat acting on a solenoid valve in the liquid line which shuts off the refrigerant, thus causing the compressor to stop on the low-pressure cutout.

This type of control keeps the coil at a low pressure when idle and is therefore effective immediately when refrigeration is called for. The power switch is kept closed during the idle season and enough refrigerant leaks by the valves to cause the compressor to cycle a few times occasionally, which action keeps it properly oiled and the seals effective.

Heating is accomplished by an Aerofin coil in the coil housing. The amount of steam admitted to the coil is controlled by a Barber-Colman motor-operated valve actuated by a thermostat placed in the return duct.

This thermostat is so placed that should the system be shut down and the outside air damper left open when the weather is cold, the thermostat would open the valve, admitting steam, so that there is no danger of freezing. Live steam is piped from the boilers in the company's main factory nearby, thus obviating the necessity for a separate heating plant in the office building.

Humidification is accomplished by a target spray type humidifier, located between the heating and cooling coils. Water is admitted to the humidifier or shut off by a solenoid valve actuated by a hygrostat. It is interesting to note here that the drip pan which forms the bottom of the coil housing is made of the company's stainless steel.

Two belt-driven centrifugal fans handle a total of 4,500 c.f.m., giving a complete air change throughout the building in approximately 4 min. The air is distributed by insulated ducts running above the ceiling to grilles located in the walls just below the ceiling, blowing horizontally. Return grilles are in the floor of the main corridor and in the floor of each of three private offices. Ducts connecting with these grilles have dust traps directly under the grilles. Each supply line has an extra damper of the splitter type and there are also dampers above the heating and cooling coils to direct the flow of air over either coil.

There is a damper arrangement in the return so that air may be drawn through the basement doorway and across the basement into the return to dry out the basement or supply it with fresh air at any time it is desired.

An outside air intake is designed to take any quantity of outside air up to full fan capacity. This makes it possible to take full advantage of the economy of using outside air on cool days, and permits "sweeping out" the enclosure whenever desired. Normally from 300 to 500 c.f.m. outside air will be used on extremely hot or humid days.

Excess air is allowed to pass out through roof ventilators from the toilet rooms. No air is supplied directly to these rooms, so that there is a continuous flow of air outward through them and no danger of air being recirculated from them to the working space. The toilet rooms and front vestibule are heated by direct radiation, manually controlled.

Vice-president Gilbert D. Boyd of the steel company told HEATING & VENTILATING that one of the most important features of the new building is the ease with which desk locations can be changed. Without windows to be taken into consideration in placing desks, it is possible to reduce office space materially, he pointed out.

Lighting

The building is illuminated by 19 lamps, each containing a modified mercury vapor tube in conjunction with two incandescent bulbs, the mercury tube giving a semblance of daylight. Each luminar will use about 500 watts. Lighting is completely uniform and can be controlled at will. Drafts caused by windows are completely eliminated, thus increasing the efficiency of the office staff and reducing the number of absences due to colds and other minor ailments.

The air conditioning system was installed and serviced by Connecticut Electric Equipment Co., Meriden, Conn., E. B. Wilcox, president. Calculations and design were by Charles G. Norton, Frigidaire Sales Corporation of New England. The coil housing and ductwork were installed by the George B. Howard Co., New Haven.

Can the Heating Contractor Handle Air Conditioning?

The author believes he can and that he will go actively after the work as soon as he can be sure of performance. Advocates a step-by-step process.

By E. R. TROXELL, JR.

WITH the advent of air conditioning, there has been allowed to creep in a misconception as to what the term implies and a reasonable doubt as to where it belongs or to what trade it will gravitate. This article is intended merely to give one man's analysis of the art and a possible course that will permit profitable progress.

Most of us firmly believe that air conditioning belongs with those who have made it possible to exist with even a reasonable degree of comfort in the temperate zone. From now on, indoors and as we travel about, we are to be made more comfortable and more healthful. Seasonal as well as climatic discomforts are to be ironed out mechanically. The job isn't quite as simple as the general public seems to think, or as baffling and mysterious as many of the trade appear to feel about it. The most serious phase in the trend of the new developments in air conditioning *seems* to involve such serious engineering problems that it gets further and further from the grasp of the average heating contractor and thereby has less and less chance of becoming the volume business we all desire. Another is that, in the minds of a great majority, air conditioning indicates, first and foremost—summer cooling.

Air conditioning is now in its early years and in many ways is in the same position that the heating industry was in when in *its* early years there were many factors, such as heat transfer, that had to be left to experience and research. That sections could be added to boilers and radiators when found necessary — if calculations had gone astray—must have helped greatly in selling the skeptical. Gradually, however, both building owners and the trade gained confidence and for many years owners have been going to reliable heating contractors and engineers for what we call complete heating systems. Engineers led the way, to be sure. That's what engineers are for. But the very large volume of heating materials sold has been made possible by wide distribution through a well established trade.

The question is whether this well established, experienced group is to be used to market air conditioning or whether it is going to be necessary to recruit, train, and bring along an essentially similar, and competing, group. If any way to use the existing group can be found it would seem to be foolish to go to the expense and bother and to take the time necessary to get another group into position to take the business away from the one already established.

Now let us see where we stand and what must be done to keep air conditioning in the hands of the same group who have made the wide use of our present-day heating possible, and at the same time let the use of air conditioning grow and expand as it should.

Two conditions must be fulfilled, regardless of who does the work which we now consider that of the contractor. One is that the field selling, installing, and servicing must be well done. The other is that there must be enough people to do this in order that volume distribution may be achieved.

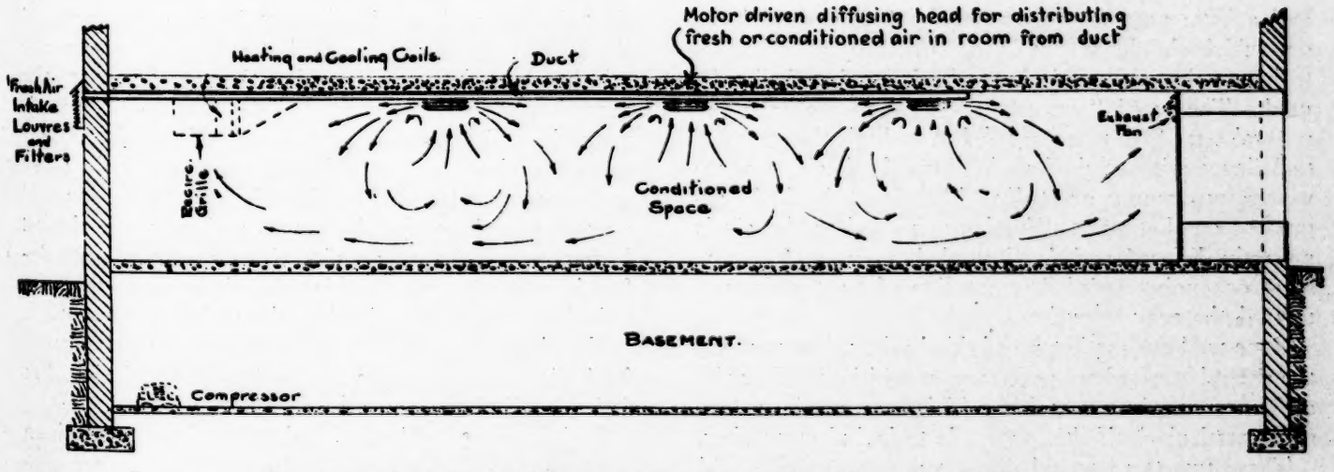


Fig. 1. Installation of diffusing heads for ventilation or air conditioning.

The question of numbers answers itself to a certain extent. The several thousand established heating contractors are well distributed over the country and there is no city or trading area of any importance which does not have its quota of these firms. True, all are not equally competent, equally reliable, or equally desirable, but this would still be true of any other group which might be set up.

The thing really hinges, therefore, largely around the question of competence and the secondary question of whether there is any incentive for the heating group to try to build up a business in air conditioning.

As the writer sees it, this requires looking into the subject in a way which may not be considered quite orthodox. It consists of taking fundamentals of air conditioning and the business of air conditioning into account.

In the first place we should not let the desire for volume run away with our good sense. We do want volume, surely, but are we building on a firm foundation? Are we frank with ourselves and reasonable in advocating complete air conditioning in all cases? Let us admit that any improvement in inside air conditions should start with fresh air, if there is any available. Let us also admit that every restaurant, shop, and meeting place cannot now or perhaps ever be sold a complete air conditioning system, even on a deferred payment plan. It would be sound business for all concerned, however, if we could build up, step by step, in such a manner that the original apparatus still functions as a part of the completed whole.

Moreover, we may as well state frankly, too, that the writer is thinking in terms of public places rather than the home. It is his opinion that the larger volume of air conditioning prospects at present lies in the field of commercial activity. Also, that the volume in this field, on the basis of being a sound business investment, will always outstrip those made in the domestic field, where air conditioning can only be classified as a healthful luxury.

If this step-by-step process is to be used, we should look into the situation and determine the proper order of the several steps. Strangely enough, the order in which the various steps of air conditioning follow along seem to parallel their simplicity and cost.

In the writer's opinion, starting with untreated air and a little natural movement, the first step and the one which should be put in regardless of all others is to insure that this air is properly diffused and distributed. The word "properly" is used to embrace the general term "air movement," but to limit that term to turbulence without drafts. Without fresh air, a space will grow clammy or stuffy. There can be little argument on that point. Furthermore, unless the air is properly diffused and distributed, it may merely come in at one point and follow the line of least resistance toward the nearest outlet.

Once we have made sure of this basic, primary move the second step, where necessary, would be to filter the air to remove dust or pollen. This may not be necessary, particularly if the system is to include a washer.

These two steps would develop a system that could operate the larger portion of the year in a warm climate only. Therefore, the addition of heating coils, and with them a means of furnishing the correct amount of humidity, comes next in importance. Cooling and the dehumidification which goes with it can be set down as the last of the major steps in building up an air conditioning system.

But the last steps will not actually promote health and comfort unless we have started right. Without proper diffusion and distribution of air in the breathing zone, matters are apt to grow worse as the other steps are added. Because of this it seems to the writer that the subject of diffusion has not received its proper emphasis.

In some existing cases, comfort seems to have been left to be governed by change in volume, velocity, or some other means, usually at the expense of the fresh air brought in. When a system cannot be operated at proper capacity because bad drafts annoy people in certain parts of the space, cutting down to suit the few may make the majority decidedly uncomfortable.

Outside air pouring from a grille, as in a straight ventilating system, may not be objectionable if no strong draft is developed. If this air is heated, however, the currents may take an entirely different course, stratifying and short-circuiting in such a way as to leave part of the space with practically no air change. Furthermore, if the air is artificially cooled, a still different circulation is set up. Obviously, all three of these cannot properly serve the space. Must we then have two or three separate diffusion systems for comfort at different seasons of the year? Not if the problem is approached from the correct starting point.

To the writer it has often occurred that the correct starting point should begin with a better understanding of the fact that complete diffusion of air brought into a space requires energy. To him, too, it has seemed logical to add this energy at the point where the air leaves the duct instead of allowing for it in sizing a central fan.

Adding the energy by means of a series of small fans at the outlet instead of by one large central fan has some features worth listing. In the first place it is possibly the only way that air leaving the duct can be broken up and thoroughly diffused with the space air before reaching the breathing zone. In summer cooling, the colder the conditioned air brought in by the duct the less moisture it will contain per cubic foot and the greater its ability to cool a space and lower the relative humidity. The colder the air, however, the more important it becomes to diffuse and distribute it properly. Conversely, air not so cold but in greater volume and at a lower velocity means not only more moisture per cubic foot but less chance of diffusion and a greater tendency for dangerous and annoying drafts. Lowering velocity to avoid a draft may therefore defeat its own purpose. Making the air less cold to make a draft less pronounced raises the moisture content.

Nor does the greater volume necessarily mean more fresh air with the present methods of recirculation. Let us be frank about that also.

Such a plan would call for the use of a motor-driven fan and diffuser plate set up in a fashion shown diagrammatically in Fig. 1. The energy of the air stream

would undoubtedly induce a counterflow of air toward the unit itself and thereby tend to limit the space served by each unit—a condition greatly to be desired. The fan should meet fixed requirements which, in themselves, would permit the cataloging of performance as well as complete dimensions of various sizes. It should not only develop sufficient suction pressure to pull fresh or conditioned air from the duct, but should give enough energy to the air stream to properly diffuse and distribute it; should be reasonably quiet, although absolute silence in spaces such as we are discussing is not necessary and perchance, from a psychological standpoint, undesirable. It might be better to advertise the fact that a store or a restaurant is air conditioned, by a slight sound of air movement than by a blast of cold air as the customer enters. The sound of rain on a tin roof may not soothe all of us to sleep, but who could object to the welcome sound of a summer breeze?

If such a system were made to bring in a positive supply of fresh air and deliver it where it would do the most good, the location of an exhaust, either by fan or through louvers, to insure removal of smoke, odors, and vitiated air, would be a simple matter. The exhaust fan alone gives no assurance as to the source of the air replacing what it blows out of the space.

Whenever it is more comfortable and the air is more invigorating outside than inside, a duct, leading perhaps from the shady side of the building, with some devices to pull in, diffuse, and distribute it, would be a logical first step toward improving conditions—and comparatively inexpensive.

This discussion would seem to offer a challenge to the air conditioning industry to design and develop such a device as we have described, with the full knowledge that it will prove we have by no means done all that is possible with fresh air before we started doing things to it. In other words, it puts emphasis on using the fresh air to its best advantage and sets up a means of securing proper diffusion, regardless of what other features are added. It recognizes that thorough diffusion and distribution throughout the space (what we do *with* the air) is of primary importance. If we fail in this, the general public will not let air conditioning (what we do *to* the air) get to the proverbial "first base."

With such a system and method of procedure outlined we can now return to the question of whether or not the existing heating contractor group is competent to do the field selling, installation, and servicing, and also whether there would be any incentive for this group to go into this kind of work.

As to competence, the writer believes that there would be no question. Where is the established heating contractor who could not select the proper number and size units, doing jobs of the type illustrated each year in his own neighborhood? He is the logical medium through which to build both volume and profit. He has learned not to try to oversell his customers. With a thorough understanding by both parties of the various steps as outlined, there is no danger on that score. He can be relied upon not to promise too much from any one step. But is there any reason why he cannot hold his customers in line, step by step, up to a complete all-year-round system, as they see the need of and can afford the various stages?

Here is part of a well established trade which has built its entire business around the idea of making people comfortable. Many are waiting only for something with which to make the start; something they can understand and about whose performance they can be sure. The lure, from the manufacturer's standpoint, is volume, for reliable heating contractors are scattered all over the country and their manpower is tremendous. They have everything at stake and merely want to *know* where they are going. There is no danger that they will stop at the "fresh air only" stage.

The original apparatus, that used to bring in fresh air, may be as far as many owners will go, but not because they are dissatisfied. The important point is that, having installed the first step, the heating contractor knows what the next step is and how to install it. For him, the mystery has faded out of air conditioning. An industry that gets under way on the basis of a gradually developing business will go places and will furnish an incentive for contractors to go out after air conditioning.

Sanatoriums and Hospitals Must Control Inside Weather

FOR tuberculosis sanatoriums over the whole country I cannot too strongly recommend an interior environment as nearly independent of the external weather as it is possible to attain. Tuberculous patients should be exposed neither to summer heat nor to winter cold. Each acute upper respiratory infection they contract may cause a flare-up in the tuberculous. Knowing as we now do the part sudden weather changes play in such acute infections, it behooves us to protect tuberculous individuals as much as possible. Open air treatment in winter or summer should give way to a controlled atmosphere of ideal character the year round. Under such conditions there would be little point in migration to certain regions that claim most beneficial climatic characteristics.

What I wish particularly to stress is the imperative need for hospitals and sanatoriums to obtain a completely controlled indoor environment the year round. The medical profession is just beginning to recognize the therapeutic importance of such control and the possible uses to which artificial climatic conditions can be put. The past few years have demonstrated the value of careful air conditioning in infant nurseries and in caring for hay fever and asthma patients, but future developments will show a usefulness for artificial indoor control that will far overshadow these lesser results already achieved.—*Dr. C. A. Mills in "The Modern Hospital."*

120 Small Boilers in Central Plant Feature Mt. Holyoke College System

In new 1000-hp. plant, steam is generated in oil-fired boilers and buildings are under control of cycling valves.

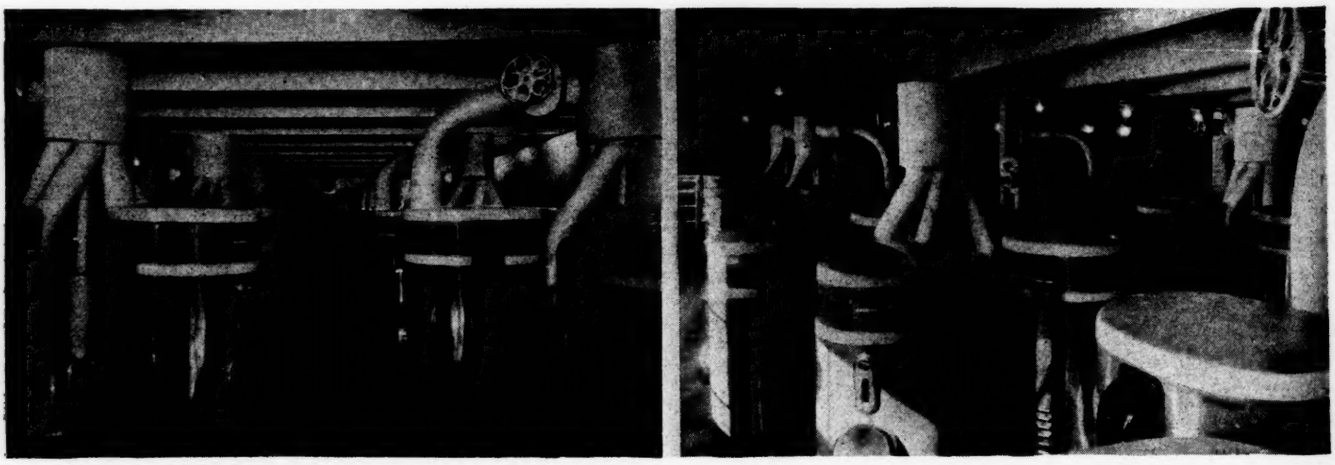
EVEN before completion of the new central heating plant at Mt. Holyoke, rumors about its unusual design became current. With the plant in operation enough details are now available to permit describing the general nature of those innovations of which there are several.

One is the use of a large number of boilers made by factory production methods instead of the more conventional type of boilers commonly put into steam heating plants of comparable size. Usual practice in boiler selection would have called for two or three boilers, each rated at a point which would have allowed one to be out of service for emergency breakdown. These boilers would have been connected to a steam header and valved for cutting off if desired. Instead of following this procedure the new plant uses 120 boilers connected to a common header by groups of five each and valved for cutting off the line as desired. The arrangement or allowance for standby or repair is not known at the time of writing.

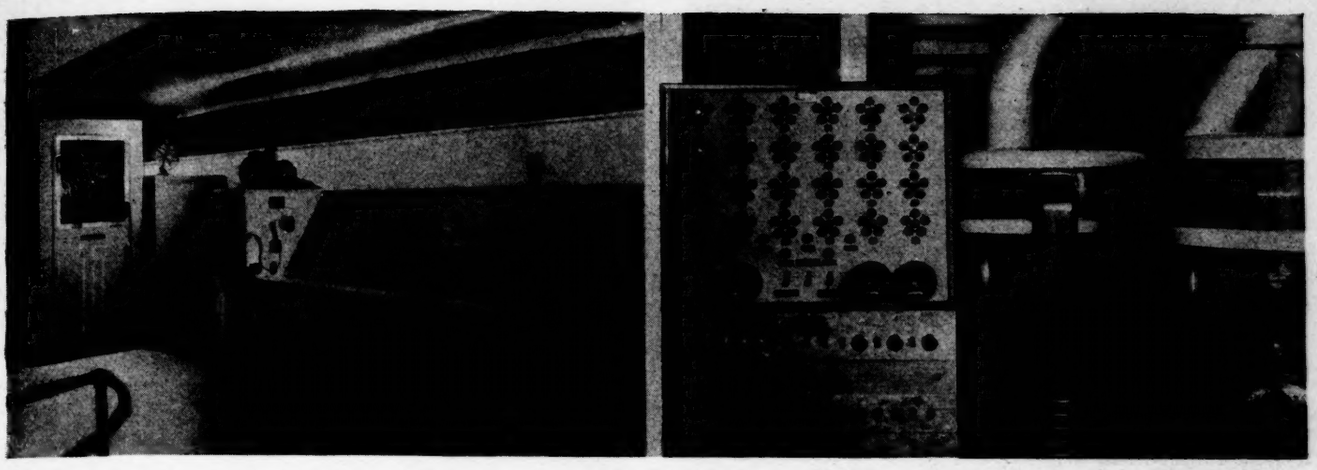
Another feature which is not usually found in institutional central plants is the method of controlling the steam flow to individual buildings of the college group. Electrically-operated valves at the buildings govern the amount of steam admitted. They are subject to a cycling mechanism operating from an outside thermostat located on the roof of the boiler house. This has the effect of placing the heating of each building under a central outside thermostatic control. The control device is so arranged that every 5 min. the valve at the building is placed in position to admit steam. In severe weather it stays open for 4½ min., while in extremely mild weather it admits steam for only ½ min. of the 5-min. period. In other words, the building may receive a substantially steady supply of steam in cold weather and in mild weather receive it only during 10% of the elapsed time.

Other out-of-the-ordinary features are to some extent subordinate to the two just mentioned. Among these may be noted the use of an operating board with telltale lights, which concentrate operating controls at one end of the boiler room; placing of steam and water piping and breechings below the boiler room floor instead of under the ceiling; and the use of controls which make operation of the boiler plant practically fully automatic.

In passing, it is interesting to recall that there is nothing especially novel about the idea of building a power plant in which a large number of relatively small generating units is used instead of a few large ones. Substantially the same idea has been repeatedly suggested in connection with Diesel-powered plants. So far as known, though, no Diesel plant has been built of similar size where the subdivision of units has been carried to anything like the point practiced at Mt. Holyoke. Old-time boiler plants for power generation used to contain as many boilers but the reason for using so many units was entirely different. In those plants it was necessary to put in many small boilers because there were no large ones available. In the Mt. Holyoke plant the argument advanced for the multiple small unit as opposed to the large one appears to have been



(Left) Boiler room of central heating plant. There are 24 groups of five boilers each—a total of 120 units. Flue gases are discharged into breeching beneath floor. (Right) Each group of five boilers supplies steam to a common vertical header at the center of the group. A group steam pipe, containing a shut-off valve, carries the steam from the side of the header to steam main beneath the floor.



(Left) Control bay of main heating plant located at one end of boiler room. View shows moderator controls and master regulator panel. The master regulator panel at extreme left controls the operation of the boilers. (Right) Pilot indicator board duplicating in lights the positions and operating conditions of every group and boiler on the floor. Central light indicates when a group is energized. Five surrounding lights show which boilers of a group are in operation. Operation of induced draft fans shown by lights in lower portion of panel.

that these units could follow the fluctuating load more closely under automatic operation and each operating unit would be generating under full load or else would be cut out of operation altogether.

Reasons for the Unusual Boiler Plant

It is said that the actual first cost of the plant as built is considerably less than would have been the case if more conventional methods had been followed. Studies were made and proposals were submitted for a stoker-fired plant and also for an oil-fired plant different than the one built.

The situation at Mt. Holyoke has its own local angles which had to be considered. The existing boiler plant had reached a state where it had to be replaced. If rebuilt on the site it was especially desirable that no unsightly stack be included on account of the surroundings. Evidently the college officials placed much stress on this point. Rebuilding on another site meant a considerable expenditure for new underground mains. Decision to adopt the design finally accepted was governed largely by these considerations, for the new boiler plant needs little headroom, uses an old coal pocket, and is so built that the building is set back into a slope with its roof covered with grassed-over soil, thus forming part of the slope itself. Use of induced draft fans makes a short stack possible. Oil storage tanks of 25,000-gal. capacity are buried, and thus out of sight. In brief, the local situation and appearance were important reasons for building the boiler plant. Estimated cost of the college's new heating arrangement is placed at $250,000.

Additional Features

While the accompanying photographs show the arrangement of the boilers, headers, and valves, and give an idea of the general appearance, there are special points to which attention should be directed.

The control bay is at the extreme end and in the center of this space is the panel which carries the indicator lights which duplicate the position of each boiler and boiler group on the floor. A glance at the board lets the operator know at once which boiler groups are energized and which boilers are operating. The control is so arranged that the boilers cut in and out automatically with the demand for steam.

Oil is fed to each boiler from the storage tank, and each boiler contains its own fan for overcoming the resistance through its passages. The induced draft central fans, which are in duplicate, work on the breechings and supply energy to carry the gases to the air from entrance to the breechings. Water is also fed automatically.

A feature of the control is that the operator may, from his control bay, set manually the temperature which is to be maintained in any building. Thus, classrooms may be kept at 70° during their hours of use and at 60° when not in use. It will be seen that while boiler operation is essentially fully automatic, still the operator is permitted enough leeway in his manual adjustments to take care of desirable operating changes. Careful original calculation and calibrations are made to insure that the desired temperature condition will be maintained in each building at all times.

In addition to the changes made at the boiler plant the college also undertook at the same time a revamping of its other heating equipment. The central plant serves 24 buildings, while 29 others are heated separately and are arranged for automatic heating with oil-fired boilers of the same type used in the central plant.

Operating costs and fuel consumption will be awaited with interest by heating engineers and contractors. Estimates place the annual oil consumption at between 500,000 and 600,000 gal. per year. As the plant has been in operation only a few weeks, little is available to check the actual fuel used against the estimates.

Design and installation of the central plant were carried out under the direction of Chester W. Colby who acted as consulting engineer on the project. Fred T. Ley, Inc., Springfield, Mass., contracted to survey the existing plant and to install the new one. Oil-fired boilers are General Electric, and the control method is one developed by Warren Webster & Company.

Selection, Training, and Testing of Pipe Welders

an important problem for contractors

By DR. S. LEWIS LAND and JOHN H. ZINK

SINCE the contractor is really the one who in the last analysis is responsible for the quality of the field welding in erecting piping, the question of means of qualifying those who are to do the welding is of the utmost importance to him. Unless he can arrange for suitable and trustworthy welders and can supply them with work, either he must stay away from welding jobs or else take them by running risks that are out of all proportion to the possible returns. In this paper, presented at a symposium on qualifying welders which was held as a part of the fall meeting of the American Welding Society, New York, the authors, both well known to our readers because of their activities in the H.P.&A.C.C.N.A., outline their views of how pipe welders should be qualified. They also believe that the contractor himself should be included in any instructional program aimed at promoting the use of welding.

The proper qualification of our pipe welders involves three important stages—selection, training, and testing. As a necessary supplement we add an intensive educational program for the contractor.

Selection of Pipe Welders

Obviously, the selection of the right men is the first and most important step. We recognize at once the fundamental soundness of the decision of the American Federation of Labor, from both an economic and industry standpoint, that welding as a process is simply another method of pipe fabrication and installation—not a separate and distinct trade, and that it belongs to the recognized trade in which the process is employed. Our whole program is accordingly built on the basis of making welding "specialists" out of our present steamfitters and helpers, and, of course, adding welding to the training courses of apprentices who are undergoing a five-year training program to become journeymen mechanics. I use the word "specialist" to elevate the good welding mechanic into the position of an artisan to differentiate him from the class literally developed over-night for the purpose of insuring the sale of a particular welding apparatus or, I regret to admit, by contractors who don't know what it is all about and apparently don't care.

It is not our belief that all steamfitting mechanics should be trained as welders. The ability to weld in our field requires physical and educational qualifications not possessed by all our men, nor do the needs for pipe welders justify the training to this extent. Even with this care in selection, our mortality rate will be relatively high. Consequently, we select from our personnel those men who are best qualified by physical and mental ability and put them through an intensive course of training. The number selected will average from 20 to 30% of our employe group.

Physical Requirements

Candidates for training are preferably selected from those between the ages of 18 and 35. They should be strong in body, have good eyesight, steady nerves, good endurance, ability to work in tight places, and a satisfactory amount of pipe-fitting intelligence.

There are exceptions to the upper limit of this age requirement, but older men as a rule do not have a whole-hearted desire to learn new methods, and they usually confront us with all the difficulties to be expected in "teaching an old dog new tricks." Exercising care as to limitation of age tends to reduce the mortality and expense, and these factors must be considered if we are to obtain proper return for our investment.

Good eyesight is required because of its advantages in fitting, alignment, and measurement, and as a protection against the misuse of the man's own safety appliances which many times occur in spite of warning and intermittent supervision. Good nerves and endurance are essential because the handling and mechanical manipulation of welding tools and stationary or awkward positions in welding are exacting and trying to both. Cleanliness of person, close fitting clothing, and reasonable knowledge of fire hazards are also necessary considerations. The diversity of our work many times subjects the welding mechanic to toxic fumes, poor ventilation, and dangerous conditions of plant operation as to make it necessary for us to give major consideration to the physical development of our selected men. And it usually follows that his degree of physical fitness determines the operating fitness of the apparatus he is using.

Educational Requirements

A technical education is not required, although it is desirable. It is not unusual for us to develop a good welder with practically no education, and in that case we strongly recommend an educational course for him

either by attending vocational or night schools, or in lieu of these, individual help in the contractor's shop. Shop conferences, authoritative books, and freedom to do experimental work in the shop under friendly and encouraging conditions, all aid materially in his education. He should be equipped with an elemental knowledge of the chemistry and physics involved in making a good weld so that he may know the functioning factors of the parent or base materials to be welded; the effect of temperature; a fair knowledge of the common metals to enable him to determine whether they should be welded or brazed, the proper process to use by knowing their limitations, and a good performance knowledge of welding rods.

He should also have a fair understanding of related mathematics, be able to interpret blueprints, make patterns and templets for special connections, and since in many localities he works alone on certain work, it is essential that we develop in him and expect him to deliver the same ability to design, plan, and perform as we do our steamfitting mechanics.

It must not be assumed from the foregoing that we expect to give him the educational background of a college professor as well as a workman. We ask no more from him than we do from our good steamfitters, and it includes the necessity and ability to use his head as well as his hands. The proper use of the welding process demands headwork as well as labor, and since we expect to develop an efficiency of approximately 80% over an 8-hr. working period with due allowance for job peculiarities, you can readily see that we must equip him beyond the actual welding application. Otherwise, we unnecessarily load the job with labor. I need only point out to you that in many metropolitan areas under jurisdiction of the trade unions a welding mechanic must carry a helper with the additional burden of restriction to actual welding and no privileges in handling piping materials for erection. The result is that work done in these localities is performed with four men when two, at most, could do it to best advantage. You can readily see the economies of welding are lost under this working plan, and is directly attributed to individual and indifferent methods of planning and education. When you circumvent the legitimate channels through which welding should be directed for selfish reasons you antagonize labor and create a vicious competitive situation between contractors and owners. This situation is so real and so unfair to welding as to suggest better coordination between the sponsors of the welding process.

Training Pipe Welders

As soon as our training group is selected approximately meeting these requirements, we plan a training period usually lasting from 120 to 180 hr. The division of that time will depend on the type of program—whether the training is being given by the contractor in his own shop, or in an approved vocational school.

If the training is given in the contractor's shop, it is essential that the contractor's own knowledge qualifies him as an instructor or he must provide it from outside sources. Training programs, to secure efficient results, must be well organized and provision made for systematic instruction. Our Educational Department gives valuable assistance to the contractor covering all phases of his shop training. If the contractor does not desire to assume this training obligation through lack of qualification or inability to make the money expenditure, we do not hesitate to urge him to seek some part of this help from our manufacturing friends. We insist upon this supervision help because mere practice at cutting and welding, without accompanying instruction, is not sufficient and may well give birth to wrong habits and skills which may be very difficult to correct.

If the training is given in an approved evening vocational school, we suggest a minimum period of instruction covering 36 weeks, two hours twice a week, a total of 144 hours. It is assumed that, particularly during the latter part of his training program, the trainee will have an opportunity to do much actual welding to gain practical experience as well. In my own case, we make available our shop facilities without cost to give him this experience and, equally important, confidence in himself. He sits in on our shop conferences, which are held at least once every three weeks on my time and not theirs, and thus we take the "kinks" out of the things he doesn't understand or misconstrues.

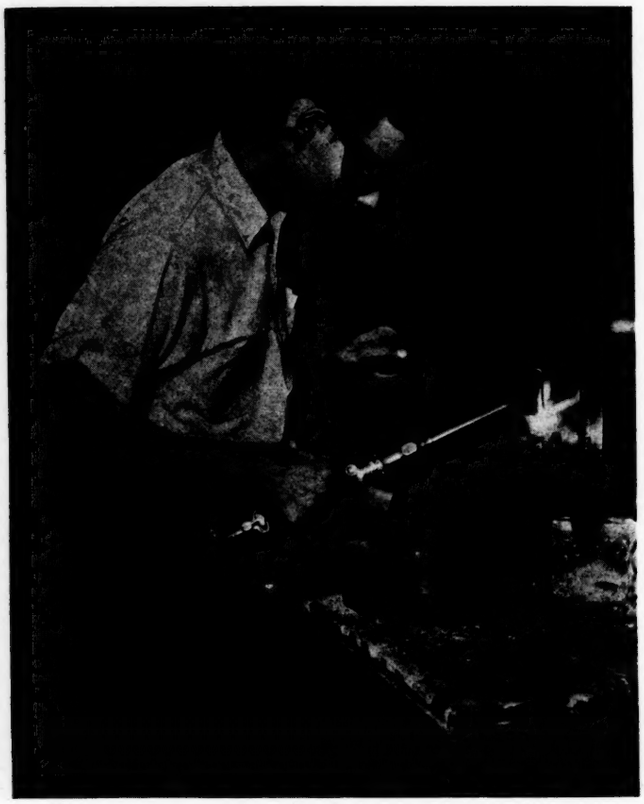
It is well to mention here that the minimum training and experience of instructors in vocational schools should be the equivalent of that required for shop and related subject instructors as set up in the state plans for vocational education. Our National Association has followed the vocational training of welders energetically and with much help, and not only have we been able to have welding courses established in vocational schools in many cities but have been shown the courtesy of supervising and recommending the training course. It is my personal opinion that as this type of vocational training grows we will bring into our industry welding mechanics with educational training and skill to better plan and perform good welding work. There is no intent here to belittle the self-made mechanic, but just as welding has improved our method of pipe installation so will the educated mechanic improve our standards of work.

There are too many varying conditions in different localities for us to compile reasonably accurate cost figures per man covering his training expense. Conditions of labor, free help from outside sources, amount of expense absorbed by contractors, etc., all tend to make average figures unreliable. In my own case, I know I have an average of $300 cash investment in each of my graduated welders without consideration to my complete loss where mechanics fail to make the grade.

You, of course, realize as I do, that the efficiency of a welder is largely determined by the amount of welding he is called upon to do. If it is a minimum, he is apt to go stale or you may lose him to a competitor. Once he masters the art of welding he is reluctant to do other kinds of work. To cope with this situation as well as avail myself of the economic advantages of welding, I am organized on a strictly welding basis, and no matter how I am compelled to estimate a job, I use my best effort to convert it to a welding installation. This gives me a better continuity of welding work, assures me of definite and comparative costs, and my welding mechanics make as much time as do my steamfitting mechanics, and I need not explain to you what this means to me from the standpoint of satisfied labor.

Testing Pipe Welders

It goes without saying that all pipe welders should be tested at regular intervals during their training



All pipe welders should be tested at regular intervals . . .

and at reasonable times thereafter during their employment. I will not elaborate on the approved tests covered in detail in the Specifications and Standards published in our "Standard Manual on Pipe Welding," but I would like to bring to your attention my objections to some of the silly demands under the head of testing predicated upon ignorance or the exercise of arbitrary powers.

I have no objection to coupons being cut out in cross section from welds made from scrap pipe either in the shop or in the field for the sole purpose of testing. I do object strenuously to these coupons being cut out of completed installations. In the first place, removing these coupons is a dangerous practice because of the slag deposited on the inside of the pipe which may cause considerable damage to valves and other auxiliary equipment. Replacement of the patch is also generally something not to brag about. I recommend that the entire weld be removed with a 6- or 8-in. section of pipe either side of the weld, and the replacement be made with a spool piece of new pipe and two circumferential line welds. Aside from the fact that one coupon may not tell a true story of a poor weld, the questionable quality of the replaced patch and finished appearance of the work should discourage the practice as a black eye on welding. I would much rather assume the initial expense to keep my reputation intact and avoid the possibility of back-charges.

I strongly recommend also a service test on a partially completed or fully completed installation where possible rather than the hydrostatic or air test. This can be done in sections where necessary with valve closures and before insulation is applied. It is not always convenient or economical to make an air or hydrostatic test. For example, it would be foolhardy to test with water or air the exposed piping in a large building operation in New York during zero weather. Too often specifications are written giving the owner or his awarding authority options of selecting either the hydrostatic or service tests, and in some cases both, with accompanying language indefinite enough to permit the widest range of interpretation—and, consequently, a wide range of estimating cost on the part of the contractor as to the cost of testing. This permits inequality in bidding and the arguments that follow do not inspire confidence.

The question of certifying a good welder so that he does not have to be subjected to the same qualification tests each time he desires to go to work is something that has given me much concern. During the stress period of the last four years, it is not unusual for a good welding mechanic to work for as many as five contractors in one month. It is not fair to him nor is it fair to us to burden us with the expense of a five-time test on the same man within one month. Either we must within our industry give this man a certificate or card to protect and give him proper rating or we must send his welds to be tested to an accredited and independent testing laboratory if strict neutrality is desired. Such a procedure and requirement might well be given serious consideration by the sponsors of welding so as to encourage uniform practice at a minimum of expense.

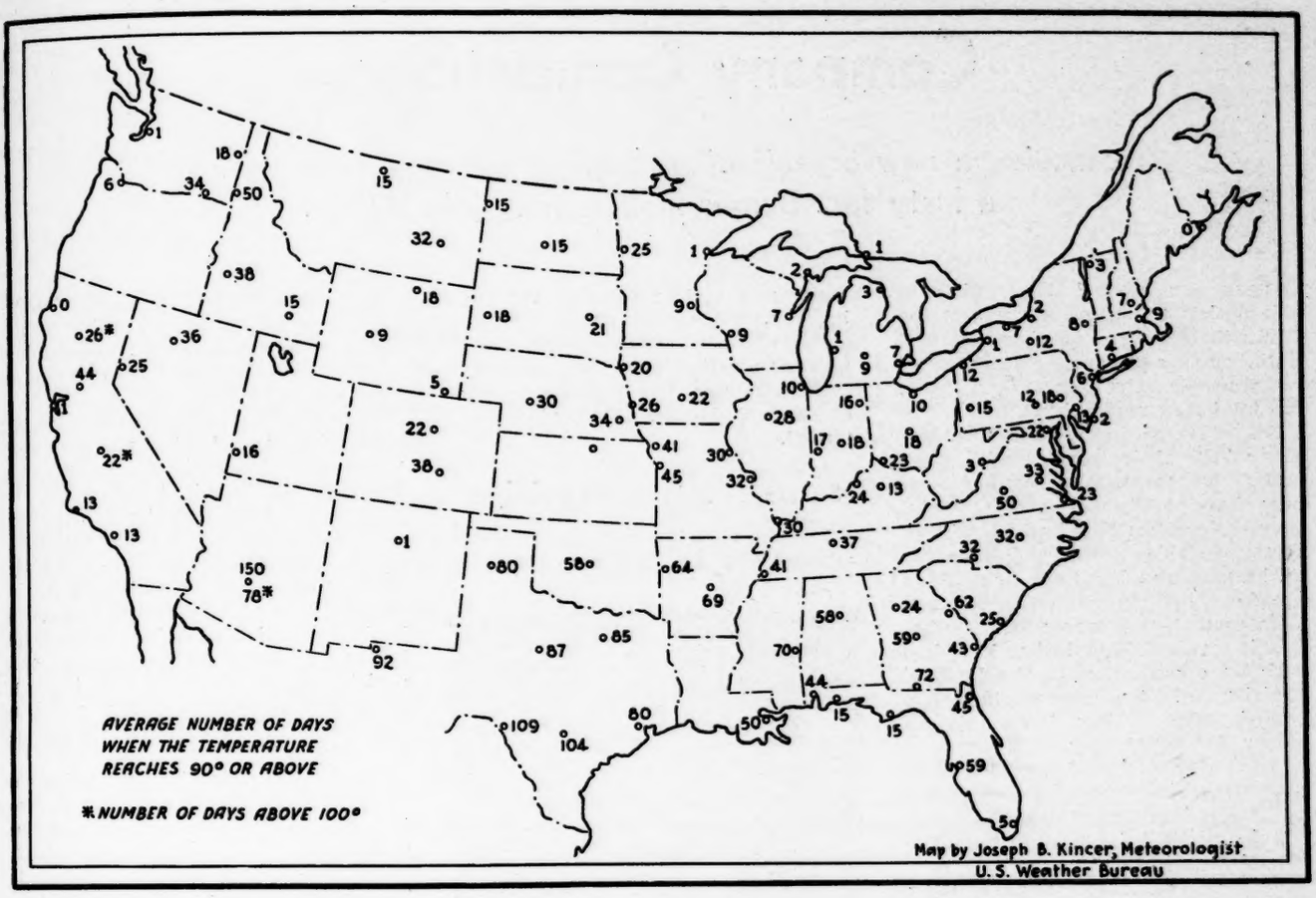
Welding rod remains somewhat of a free lance under our pending codes. We are told that the analysis of the rod as manufactured is not a true criterion of its value after deposit. I well realize the practical difficulties encountered by the code makers in dealing with this problem, but the irony of it all is that the contractor must assume all the responsibility for a product over which he can exercise but a minimum of control. Until the research divisions of the welding industry clear up present uncertainties, I favor some form of welding rod certification to guide us in our purchase so as to minimize "passing the buck" due to divided responsibility, and perhaps taking advantage of our admitted ignorance is another justification for this appeal. Too often have I seen good welders innocently pay the penalty for the results of using poor quality welding rod, and in this respect I pay my compliments to the astute salesman who, for volume sales and personal commissions, elevates inferior welding rods to the exalted position of welding everything including a broken heart.

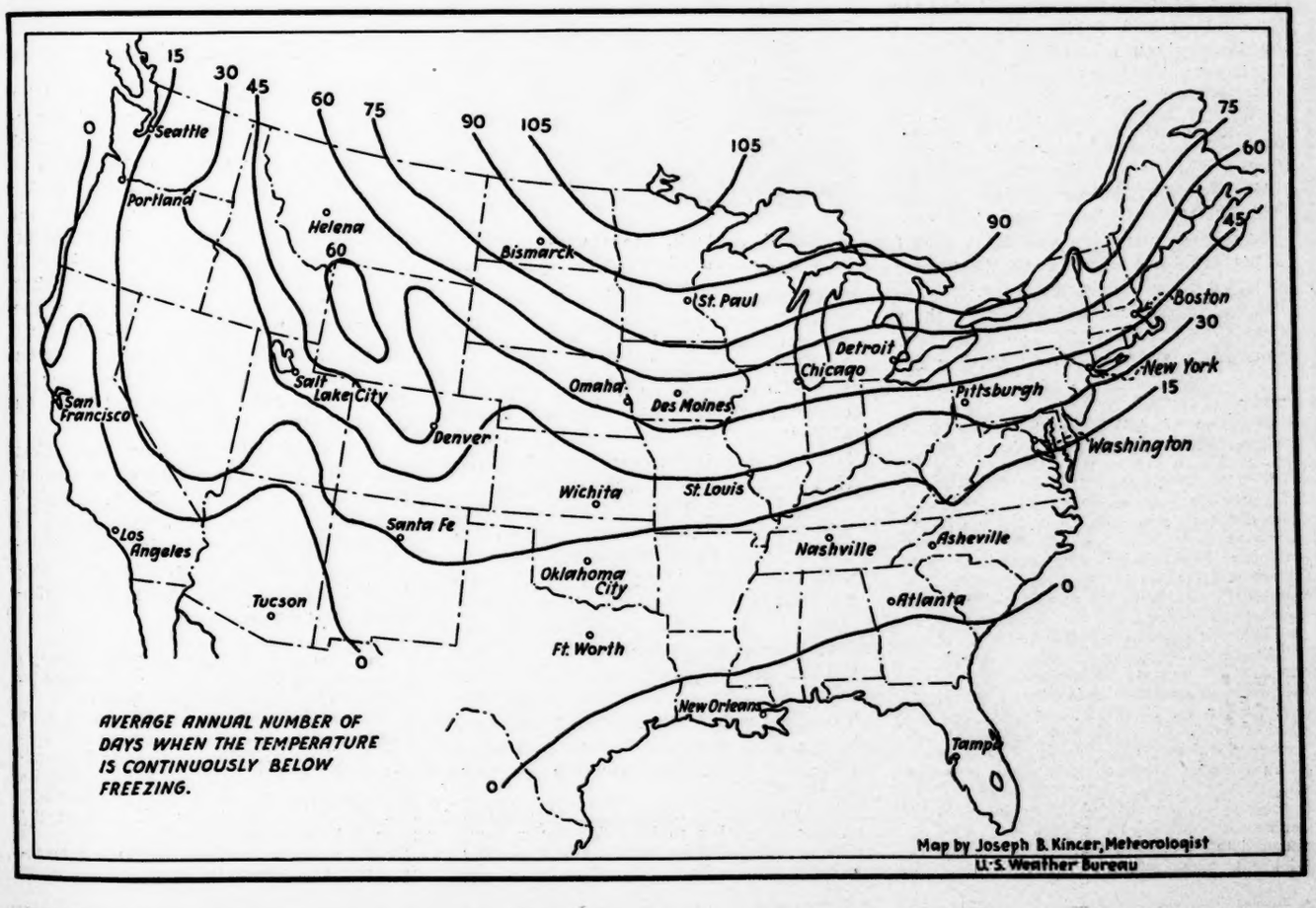
The technique employed by mechanics is not specifically covered in pending codes and is usually left to individual habits. Proper penetration and fusion of a pipe weld involves a fundamental knowledge of temperature regulation, spacing, flux control, a very definite knowledge of the over-lapping requirements to properly close a weld, apparatus adjustments and, in the case of flange attachment and intersection welding, ability to normalize a weld for the distribution of stress and to reestablish alignment.

From the standpoint of management, promotion, design, and costs, the contractor cannot escape his obligations of knowledge, organization, and finances, and these demands are equal in importance and bear direct relation to those required of him in gaining his reputation under our older methods of pipe erection. Buying a welding outfit and trusting to luck is not sufficient qualification for a contractor, or anyone else, to enter the welding field. So long as we neglect this very necessary phase of our instructional program,

(Concluded on page 67)

Summer and Winter Weather Data


AVERAGE NUMBER OF DAYS WHEN THE TEMPERATURE REACHES 90° OR ABOVE
* NUMBER OF DAYS ABOVE 100°
Map by Joseph B. Kincer, Meteorologist
U. S. Weather Bureau



Burner Dealers, Threatened by Oil Company Competition,

conceive a new organization, hope it can do battle against a lusty foe. Burner makers may join NEMA.

THERE are several thousand sizeable outlets selling oil burners in the U. S.; there are probably six thousand if the smaller dealers are included; if everyone who sells burners is included, the total may reach 18,000.

All of these have their troubles; many have their troubles with price cutting by competitors; some of them now have additional and powerful competition from Standard Oil of New Jersey, which is selling and installing oil burners at a low price in order to broaden its market for fuel oil.

To combat such moves an organization is required. The dealers have had such an organization in the Dealers' Division of the manufacturer-controlled AOBA. They have this no longer, for AOBA may soon become a division of the National Electrical Manufacturers Association, better known as NEMA, leaving the dealers stranded, since NEMA is purely a manufacturers' organization.[1]

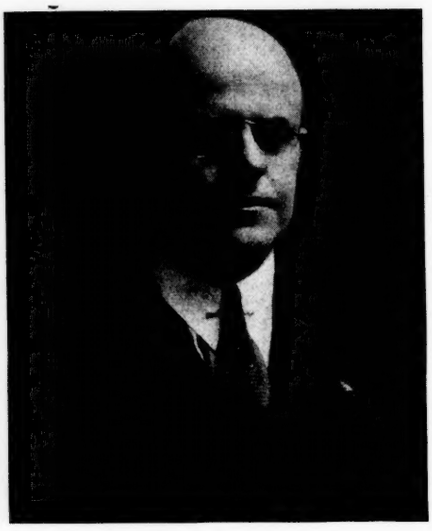
To meet these situations a mass meeting of five hundred oil burner distributors and dealers was held at the Pennsylvania Hotel in New York October 9. The mass meeting authorized the formation of the National Oil Burner Dealers Association, which formally organized October 17 and elected officers and directors to serve until the annual meeting in March, 1935. NOBDA will be national in scope, but present formation will be confined to metropolitan New York, including northern New Jersey territory.[2]

More important to the dealers than being cut off from AOBA is competition from Standard,[3] which is selling oil burners in certain districts for $285, including a 550-gal. tank.

Dealers in territories where Standard is operating under this plan are considerably concerned and foresee an end to their business if the plan is extended.

Standard's Side of the Question

There are three principal reasons advanced by Standard as responsible



Arthur W. Clark, secretary-treasurer and executive director, newly-formed NOBDA.

for its campaign:[4] (1)—Necessity of keeping refining plants "in balance"; (2)—To avoid price dictation by purchasers, necessity of a balanced outlet of 50% fuel oil sales to brokers and 50% direct retail sales; (3)—Competition from other fuels, notably gas.

Regarding (1) Standard claims that with present gasoline production requirements and use of modern cracking processes the refiners as a whole need 300,000 new oil burner installations annually to dispose of fuel oil to the best advantage. Standard claims that the burner industry instead of organizing to carry out such a program, has become a racket; that for 256 manufacturers and 18,000 dealers to distribute from 70,000 to 120,000 burners per year is grossly inefficient operation. Standard believes its policy of selling burners at a low price and with liberal installment payments will open up a new market.

Regarding (2), Standard pointed to a situation in St. Louis some years ago wherein Shell was dictated to by brokers. Further, Standard claims that almost every burner dealer is tied up with a fuel oil connection and this makes it difficult for them to sell 50% of their oil direct. This is said to be necessary so that Standard is not to be in a position of being dictated to by the brokers. The oil company's final decision to go ahead with their plan came as a result of the activity of gas companies in Washington, Baltimore, and Chicago.[5]

Standard justifies its $285 price on the basis that it makes a manufacturing profit and a sale and installation profit.[6] The oil company threatens that the price will drop to $225 before long. The price certainly will not be raised.

The Dealers' Side

Dealers, on the other hand, claim that the oil burner business and, consequently, the domestic market for fuel oil, were built up due to the efforts of the individual manufacturer and dealer without any help whatever from the oil companies, who left the oil burner industry to struggle along as best it could, and now that the industry has obtained acceptance on the part of the public, wish to freeze out the dealers; that Standard cannot make a profit on the $285 price; that if the latter is true, Standard's move constitutes an unfair trade practice.

The oil burner dealers hope that through their newly-formed organization they can persuade NRA, the Federal Trade Commission, and other governmental agencies to interest themselves in their problem, give them protection against Standard's (and similar) campaigns.

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[1]Directors of AOBA at their New York meeting October 9 considered joining NEMA, appointed a committee to investigate such action. The committee will report to the directors at their next meeting early in January. The directors also considered the matter of dropping their annual oil burner show and allowing local dealer associations to hold shows in their own cities instead, in view of the fact that such shows are more popular at the present stage of the industry where the shows are held for the public rather than the trade.

[2]At the organization meeting Leonard C. Smythe, president of the Northern New Jersey Oil Heat Association, was elected president, and Arthur W. Clark, formerly head of the Dealers' Division, AOBA, was made secretary-treasurer and executive director.

[3]In addition to competition from Standard Oil of New Jersey, Shell is reported to be making a survey with the idea in mind of entering the oil burner picture, and Gulf is rumored to have taken over one of the largest oil burner manufacturers.

[4]As reported to Lionel L. Jacobs, AOBA director, September 28 by Wiley Butler, manager of fuel oil sales for Standard of New Jersey.

[5]In Chicago, as pointed out in last month's HEATING AND VENTILATING, utilities have installed 22,000 gas conversion burners.

[6]The oil company is installing Gilbert & Barker burners. G & B, a subsidiary of Standard, in other territories is operating independently. One G & B representative justified his company by saying they sold burners to Standard, who naturally could resell them at any price they cared to. Actually, however, this is not the case if Standard is claiming a manufacturing profit on the burners.

Heating and Ventilating

MODERNIZING

A monthly section for promoting the interests of engineers and contractors in the modernizing and renovizing of heating, ventilating, and air conditioning plants in buildings.

53.8% OF URBAN RESIDENTIAL STRUCTURES HAVE CENTRAL HEAT 30

Material from the Real Property Inventory rearranged by states and to permit classifying on the basis of number of structures instead of by number of dwelling units—a weakness present in all earlier reports of data on this project.

ON THE FIRING LINE 32

A heating contractor who began business in 1928 as well as a firm organized 45 years ago have both been able to find considerable business even during the depression years.

MODERNIZING EXPENDITURES DOUBLED THIS YEAR 33

Figures on the volume of repair and replacement business done during the first nine months of 1934 in the 37 eastern states. Volume reported is nearly double that of corresponding period last year. Commercial buildings show largest increase.

CHAIN SHOE STORES MODERNIZE WITH AIR CONDITIONING 35

The Chicago store of a 90-store chain put in air conditioning during the past summer. It was a modernizing job and getting the ducts into the mezzanine called for much ingenuity.

LOCAL FHA CAMPAIGNS UNDER WAY 36

$10 million has been loaned for modernizing under the FHA Plan; the success of the plan is assured. What the local campaigns are accomplishing and an outline of the future plans of the Housing Administration.

DON'T NEGLECT INSULATION IN MODERNIZATION PLANS 39

Insulation of boilers, pipe lines, roofs, and sidewalls gives chance for doing much modernizing work. A few progressive contractors are getting these jobs largely because they realize that the work can be had; others are overlooking it.

CONTRACTORS FORM GENERAL CONTRACTING PARTNERSHIPS 40

Subcontractors in some cities are going together to take general building contracts, especially for modernizing work. It is reported that these partnerships are meeting with success.

53.8% of Urban Residential Structures Have Central Heat

FORTY-SIX and two tenths per cent of the urban residential buildings in the country are heated by stoves, fireplaces, or have no heat whatever; 39.4% are heated by warm-air systems; 8% are heated by steam and vapor plants, and 6.4% have hot water heat.

These figures are shown by a tabulation made by HEATING AND VENTILATING and based on the Real Property Inventory conducted by the Bureau of Foreign and Domestic Commerce of the Department of Commerce within the last year. The survey covered 63 cities. Using these cities as a sample the findings have been projected to cover all of the residential buildings in the country (excepting New York City). The results, shown in the accompanying table, indicate the huge market for modernizing heating plants that exists in this country.

It must be emphasized that *the table covers only residential buildings* (such as homes, apartments, clubs, and hotels). Furthermore, *the table does not cover rural homes; does cover urban homes.* In this connection, the word "urban" is used to indicate towns of 2500 and over. In extending the Inventory figures, it was believed that the sampled cities were by no means typical of rural homes, and for this reason rural homes are not included in the table.

Preliminary figures as reported by the Real Property Inventory for the 63 cities and published in this and other magazines did not accurately answer the questions as to how many warm-air or steam plants there are in the country. The reason was that the Inventory was taken on the basis of dwelling units. On this basis a single family house is considered as a dwelling unit and an apartment house with 150 apartments is considered as 150 dwelling units. Consequently, such an apartment house was listed by RPI as 150 steam-heated dwelling units. In other words, any one using the figures and wanting to know how many steam plants there are in the country would find the figures considerably overbalanced because the apartment house referred to would show up on the final result as 150 steam heating plants. This fallacy was called to the attention of the Department of Commerce by HEATING AND VENTILATING and the Department cooperated with us in having the data taken off on the basis of structures. This material was then extended by states, as shown in the accompanying table.

As would be expected, the greatest percentages of buildings having no central heating plants are those in the south. This percentage runs over 60% in all of the southern regions, reaching the highest in Arkansas where 98.7% of the buildings have no central heat.

The most popular region for warm-air heating is the east north central. Of these states Michigan has the highest percentage with 76.6% of its urban residential dwellings so heated. The following table shows the states having the highest percentage of warm-air heating plants, the figures being in per cent of that state's total: (*indicates New York City not included)

WARM AIR

Michigan	76.6%
New York*	73.1
South Dakota	70.2
Nebraska	69.5
Wisconsin	66.5

The New England states lead, as a region, in percentage of structures heated by steam or vapor. The five leading states in this group are:

STEAM AND VAPOR

Rhode Island	45.0%
Massachusetts	43.6
Maine	43.4
Maryland	30.0
District of Columbia	30.0

The leading states in percentage of hot water heat are as follows:

HOT WATER

Minnesota	34.5%
Delaware	28.8
Connecticut	27.7
New Jersey	26.0
Virginia	25.6

The following tables show the states with the greatest number of a given heating plant, the number of such plants, and percentages in per cent of the country's total:

WARM AIR

Illinois	933,721	15.1%
Pennsylvania	854,715	13.9
New York*	673,153	10.9
Ohio	622,009	10.1
Michigan	612,984	9.9

Thus these five states account for 59.9% of all the warm-air plants in the country.

The five leading states for steam and vapor, and which account for 59.3% of the country's total of such plants, are:

STEAM AND VAPOR

Massachusetts	400,205	32.0%
New Jersey	120,110	9.6
Pennsylvania	81,475	6.5
Maryland	70,829	5.7
New York*	69,065	5.5

The states having the most hot water plants are:

HOT WATER

New Jersey	211,005	21.1%
Pennsylvania	146,040	14.6
Minnesota	106,168	10.6
Connecticut	75,530	7.6
Illinois	67,102	6.7

These five states account for 60.6% of the total number of hot water plants in the country.

There are more homes without central heating plants

(Text concluded on page 67)

NUMBER AND TYPE OF HEATING SYSTEMS IN URBAN RESIDENTIAL BUILDINGS.

(Based on the Real Property Inventory)

STATE AND REGION	WARM AIR		STEAM AND VAPOR		HOT WATER		STOVE, OTHER, OR NO HEAT	
	%	NO.	%	NO.	%	NO.	%	NO.
MAINE	15.2	11,906	43.4	33,994	12.9	10,104	28.5	22,323
NEW HAMPSHIRE	25.0	16,865	27.0	18,214	2.9	1,956	45.1	30,425
VERMONT	39.0	11,641	8.9	2,657	15.7	4,687	36.4	10,865
MASSACHUSETTS	15.7	144,111	43.6	400,205	2.7	24,783	38.0	348,803
RHODE ISLAND	13.2	20,049	45.0	68,350	1.1	1,671	40.7	61,818
CONNECTICUT	23.0	62,714	5.8	15,815	27.7	75,530	43.5	118,612
NEW ENGLAND	17.6	267,286	35.5	539,235	7.9	118,731	39.0	592,846
NEW YORK†	73.1	673,153	7.5	69,065	2.7	24,863	16.7	153,785
NEW JERSEY	36.9	299,466	14.8	120,110	26.0	211,005	22.3	180,977
PENNSYLVANIA	55.6	854,715	5.3	81,475	9.5	146,040	29.6	455,028
MIDDLE ATLANTIC†	55.8	1,827,334	8.3	270,650	11.7	381,908	24.2	789,790
OHIO	53.6	622,009	4.2	48,740	4.1	47,579	38.1	442,136
INDIANA	53.6	252,631	3.4	16,025	2.0	9,427	41.0	193,244
ILLINOIS	65.4	933,721	2.2	31,410	4.7	67,102	27.7	395,475
MICHIGAN	76.6	612,984	8.4	67,220	1.7	13,603	13.3	106,432
WISCONSIN	66.5	259,801	2.4	9,376	11.9	46,491	19.2	75,010
EAST N. CENTRAL.	63.9	2,681,146	4.2	172,771	4.4	184,202	28.4	1,212,297
MINNESOTA	38.1	117,247	2.4	7,386	34.5	106,168	25.0	76,933
IOWA	66.4	174,203	2.4	6,297	3.3	8,658	27.9	73,197
MISSOURI	34.5	169,752	1.3	6,396	3.1	15,253	61.1	300,633
NORTH DAKOTA	56.0	14,520	3.6	934	24.4	6,327	16.0	4,149
SOUTH DAKOTA	70.2	22,992	2.7	884	4.6	1,507	22.5	7,369
NEBRASKA	69.5	87,433	2.4	3,019	5.0	6,290	23.1	29,060
KANSAS	41.3	82,064	1.9	3,775	1.9	3,775	54.9	109,088
WEST N. CENTRAL	46.2	668,211	2.0	28,691	10.2	147,978	41.6	600,429
DELAWARE	29.9	8,969	3.4	1,020	28.8	8,639	37.9	11,369
MARYLAND	23.4	55,246	30.0	70,829	9.8	23,137	36.8	86,883
DISTRICT OF COLUMBIA‡	23.4	29,380	30.0	37,666	9.8	12,304	36.8	46,204
VIRGINIA	4.2	7,864	2.7	5,055	25.6	47,934	67.5	126,388
WEST VIRGINIA	35.2	41,105	12.2	14,247	8.9	10,393	43.7	51,031
NORTH CAROLINA	13.6	24,540	13.4	24,179	5.1	9,203	67.9	122,521
SOUTH CAROLINA	6.0	5,317	1.6	1,418	3.0	2,659	89.4	79,230
GEORGIA	18.8	42,132	5.7	12,774	0.6	1,344	74.9	167,854
FLORIDA	1.5	3,034	1.9	3,843	1.2	2,427	95.4	192,945
SOUTH ATLANTIC.	15.6	217,587	12.4	171,031	8.5	118,040	63.5	884,425
KENTUCKY	9.0	18,672	2.7	5,602	2.0	4,150	86.3	179,047
TENNESSEE	14.4	32,483	4.6	10,361	0.9	2,027	80.1	180,412
ALABAMA	10.9	19,908	2.9	5,296	1.8	3,287	84.4	154,145
MISSISSIPPI	1.4	1,221	0.7	610	0.3	262	97.6	85,137
EAST S. CENTRAL.	10.4	72,234	3.2	21,869	1.4	9,726	85.0	598,741
ARKANSAS	0.3	297	0.7	694	0.3	298	98.7	97,882
LOUISIANA	0.2	408	0.1	204	2.1	4,293	97.6	199,531
OKLAHOMA	5.5	11,696	0.8	1,702	0.2	425	93.5	198,804
TEXAS	1.4	8,421	0.8	4,812	0.1	601	97.7	587,661
WEST S. CENTRAL.	1.9	20,822	0.7	7,412	0.5	5,617	96.9	1,083,878
MONTANA	14.9	6,985	1.9	891	7.1	3,329	76.1	35,676
IDAHO	26.7	8,839	1.0	331	7.7	2,549	64.6	21,386
WYOMING	24.0	4,481	3.0	560	7.3	1,363	65.7	12,268
COLORADO	33.1	46,783	2.8	3,957	2.0	2,827	62.1	87,771
NEW MEXICO	16.8	4,424	7.7	2,027	3.1	816	72.4	19,063
ARIZONA	6.4	2,433	1.4	532	1.1	418	91.1	34,640
UTAH	33.9	21,691	2.3	1,472	4.0	2,559	59.8	38,264
NEVADA	31.4	3,044	5.7	553	3.7	359	59.2	5,738
MOUNTAIN	26.1	98,680	2.7	10,323	3.8	14,220	67.4	254,806
WASHINGTON	46.0	112,691	1.3	3,185	6.0	14,699	46.7	114,405
OREGON	57.3	79,955	2.1	2,930	1.4	1,953	39.2	54,699
CALIFORNIA	10.3	124,855	1.8	21,820	0.4	4,849	87.5	1,060,666
PACIFIC	19.9	317,501	1.8	27,935	1.3	21,501	77.0	1,229,770
TOTAL† U. S.	39.4	6,170,801	8.0	1,249,917	6.4	1,001,923	46.2	7,246,982

†Not including the City of New York
‡Est'd. same as Maryland

Note: Percentages for each state (or region) are in per cent of the total urban residential buildings in that state (or region).

ON THE FIRING LINE

Practical, usable, and result-getting methods and experiences in getting business

Modernizing Builds a Business

Friends tried to dissuade this heating contractor from his announced intention of hanging out his own shingle, which he did in 1928 in the days just before the great retreat. It is interesting to note that this firm's business has grown steadily during the six-year period. Emphasis on modernization, through the instrumentality of a good service department, is given as the foundation of the business.

Essentially, success in this case has come through the application of none but modern selling methods. We have a perfect example of ingenuity versus recalcitrance, readiness to try new business methods instead of passivity, increased selling energy rather than paring down and submitting to what some feel is the inevitable.

Shortly after this heating contractor started up he purchased two electric vacuum cleaners to clean boilers and furnaces, purchased demonstration models of oil burners and humidifiers, and set up a modern boiler in an attractive display room on a principal highway. The next step was the employment of four salesmen and the opening of heating displays in showrooms of seven sub-dealers. Each sub-dealer in turn employed several salesmen, so that the entire force now exceeds 20 men whose duty it has been to find heating work of any and all kinds. The result is that this contractor is said not alone to sell the most appliances in his territory but also to handle the largest volume of general heating work, the great bulk of which is modernization.

Whether the appliances pave the way for modernization work or vice versa is hard to say. More than likely the one helps the other and both go together.

While the outside men are making heating surveys an alert young lady in the office spends most of her day at the telephone. The object is to obtain leads that can be turned into work. At this time, although other appeals have been made, names of the wealthiest and best known residents are taken from club rosters, tax lists, and similar sources, telephone calls are made to ask if there is an oil burner. The telehone clerk states that the contractor is making a survey, which is the reason for the inquiry. If there is no satisfactory burner a salesman calls in a few days. Results are astonishing, with three to five contracts from every 100 calls.

As already stated, this contractor omits no possible avenue to a heating contract either for new materials or for modernization of existing plants. A favorite variety of business is the addition of automatic controls that enable oil burner and stoker owners to secure hot water in summer by means of their burners. This type of installation usually is referred to as summer-winter hook-up.

The aforementioned vacuum cleaners, pressed into service the year 'round, get the contractor's men into basements. Once there they recognize one or more kinds of modernization that can be done.

"Get into the basements; heating modernization opportunities are quickest found there," advises the contractor, who adds that the contractor who makes the greatest number of personal contacts usually makes the largest number of contracts.

Another feature of the modernization work is the desire to adopt anything that smacks of modernity as soon as it has been tried long enough to be approved. In late years people have been hearing much about humidity while air conditioning is on everyone's tongue. Presto, a manufacturer's truck soon backs up to the contractor's door with two varieties of "air conditioning" boilers and furnaces. This firm will take contracts for any air conditioning job, whether it represents $100 or $100,000 and whether it involves steam and hot water boilers or warm-air furnaces.

Work done by this firm is said to be so excellent that architects and engineers from surrounding territory readily cooperate on projected work. The "Home Building Center," a semi-real estate and civic organization designed to aid people who wish new or modernized homes, has been the source of many inquiries.

Another favorite heating theme now is combined burners and boilers. Wherever burners are found in use more than seven years, an effort is made to have owners replace them with special boilers. Maintenance cost reduction and fuel saving are the most telling arguments.

Firm: Lockhart Heating Co., Norfolk, Conn.

Wider Operation Promotes Modernizing for an Old Established Firm

Here is a 45-year old organization of contracting heating engineers who have outwitted unsettled business conditions in late years by extending the range of their activities as well as adopting the most modern equipment available as soon as it has been brought to their attention. Although previously their name and reputation were known to hundreds in a few Eastern states, now it is known to thousands in practically all states from Maine to Florida and east of Chicago, where a number of contracts have been fulfilled.

According to both the secretary and the treasurer of this firm, when faced with declining new construction two paths were open: one withdrawing into a comparatively narrow sphere, the other going farther afield for business. The latter seemed to offer greater opportunities, hence although the erection force now is not so large as in former years, the company's liter-

ature and personal contacts reach a far more widely separated list of prospects than formerly.

Installation of all approved kinds of heating, ventilating, and air conditioning in public buildings and private estates has been this company's forte for a generation. In such an organization it is but natural that contacts with architects and consulting engineers have been many. During boom times personal contacts necessarily were limited, since 1930 old acquaintances have been renewed, with the result that while few calls for engineering services come from any one source, the aggregate number from many sources proves almost as great now as at any time.

The forms of modernization best liked by this organization include replacing old warm-air furnaces with steam and hot water installations, insulating old boilers, installation of summer-winter hot water under their own system of automatic control, replacing old boilers with new matched units and air conditioning. Asked to mention one of the foregoing in particular that offered unexcelled new business prospects, the officers declined, saying that if one is willing to seek contracts energetically he can secure a good volume in any or all of the foregoing. According to the treasurer, however, burner-boiler, matched units seem to afford prime opportunities. A large number of such installations as replacements have been made, notably in local schools, during recent months.

Personal contacts and steady mailing of refined literature—they get out their own without outside assistance—are held to yield the best results. Fuel saving, cleanliness, and release of basement space for purposes other than heating, are prevailing arguments. Through an agency connection with one of the largest and most prominent manufacturers of air conditioning they have become virtually representative within a radius of many miles of their home city. Installations embrace mercantile, industrial, and residential buildings without discrimination.

New construction and modernizing old structures make up about equal parts of the firm's business. Considerable activity is evident now in modernizing outbuildings of country estates for rental purposes. Whereas the old furnaces evidently were deemed adequate for superintendents and gardeners who formerly occupied estate outbuildings, the heating engineers and contractors here discussed are making improvements in many such buildings by remodeling old piping systems, replacing warm air with steam and hot water, replacing conversion burners with special matched boilers complete with burner, zoning piping and installing motorized valves, adding radiators and like improvements to render estate buildings suitable for renting at substantial figures by those who desire privacy and estate atmosphere and have funds available to pay high rental for this sort of residence.

Another activity now includes school buildings. Old hand-fired boilers that previously used egg-sized coal are suitable places for stokers and forced draft blowers. Other items of interest in such buildings are automatic controls, new and larger water heaters, additional radiators, ventilating fans, and humidification apparatus. Fuel and labor saving are the dominant purchasing motives, economical operation apparently being demanded by taxpayers who have become restive under the high fuel bills incident to most school and public building operation. School boards are said to look favorably on any and all ideas from this engineering contracting firm that will permit economy.

Recent contracts filled were in South Carolina, Ohio, and Canada. Due to the far-flung and good reputation of the organization, professional men frequently ask for advice. If the firm does not receive the contracts for installation, charge for engineering services is invariably made. A recent bulletin issued and sent to every architect east of Chicago presents a map of Long Island and the Connecticut shore with dots. Each dot represents 10 or more installations made in the area. There are 140 dots in this comparatively small territory.

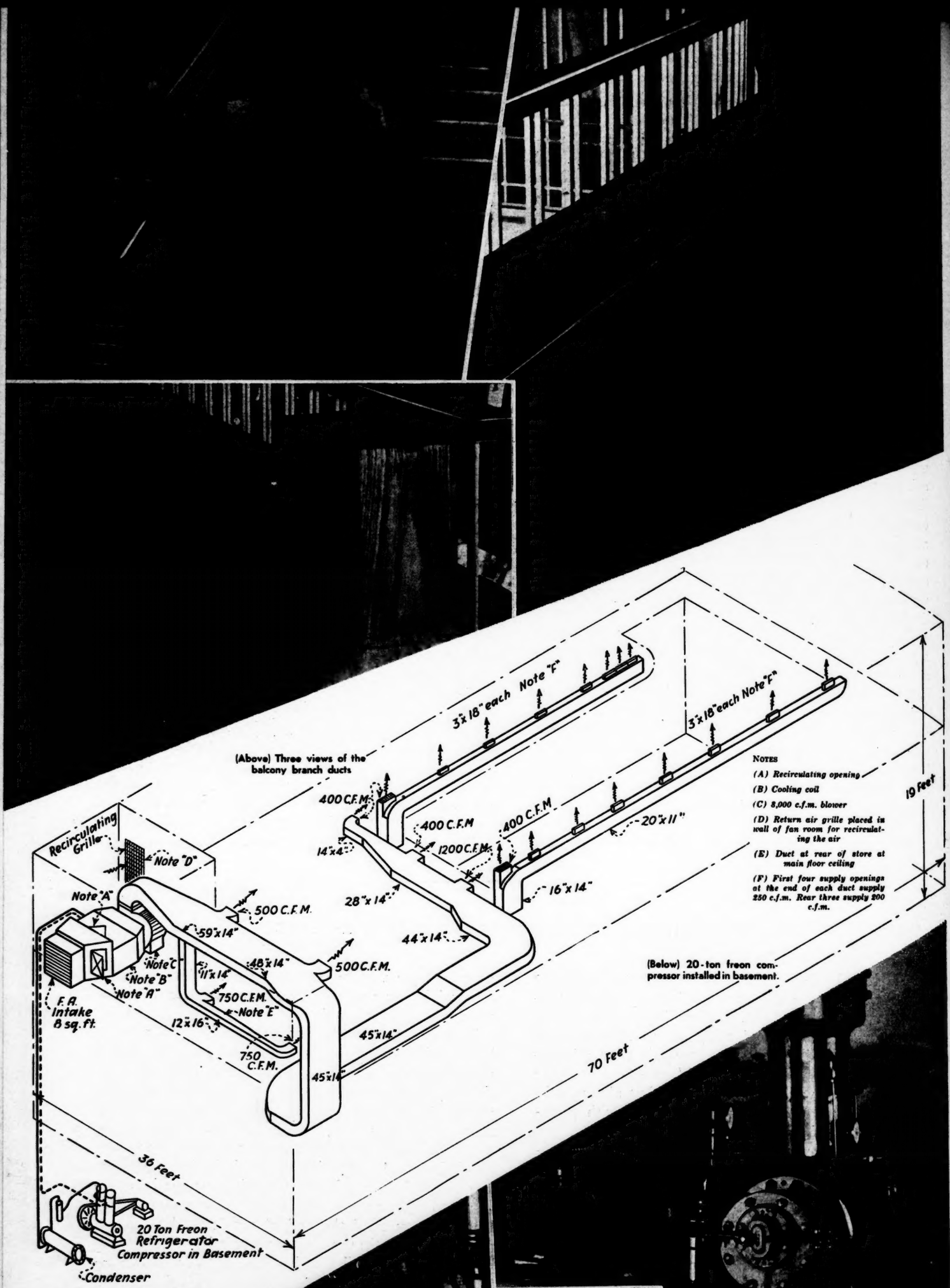
Firm: The Hopson & Chapin Co., New London, Ct.

Modernizing Expenditures Doubled This Year

REHABILITATION and improvement of neglected property of all kinds is growing into a national program, according to F. W. Dodge Corporation. Contracts for alterations and additions to all classes of structures have doubled in volume this year as compared with last year. In the 37 eastern states the amount of such work recorded in the first nine months of this year was $277,878,300, compared with $139,418,000 for the corresponding period of 1933.

A little over half of this year's modernization expenditures were made on privately-owned commercial, industrial, and residential buildings. The largest single item in this year's record was $56,213,800 for commercial building improvements, a 69% increase for this class of work over the corresponding period of last year; alterations and improvements for residential structures amounted to $45,977,100, a 36% increase over last year. These figures do not include small repair jobs, or many jobs resulting from loans made under the FHA plan.

This year's upward trend in rehabilitation projects is an indication of the timeliness and probable success of the current national modernization program. Although the announced goal of $1,500,000,000 of modernization business by the end of 1935 looks very large, it would actually cover less than 20% of the country's known requirements for housing repairs of all kinds, without touching the needs for improvements in existing housing, for new housing, or for improvements to other classes of property. One modernization loan per day until the end of next year by each of the lending institutions now prepared to make such loans is probably all that is required to reach the desired goal.



(Above) Three views of the balcony branch ducts

NOTES

(A) Recirculating opening

(B) Cooling coil

(C) 8,000 c.f.m. blower

(D) Return air grille placed in wall of fan room for recirculating the air

(E) Duct at rear of store at main floor ceiling

(F) First four supply openings at the end of each duct supply 250 c.f.m. Rear three supply 200 c.f.m.

(Below) 20-ton freon compressor installed in basement.

(Above) Isometric sketch of air conditioning system in Burt's Shoe Store. Refrigerator in basement and air conditioning apparatus and most of ductwork on balcony

(Right) Condenser and piping used to liquify freon after it leaves the compressor

Chain Shoe Stores Modernize With Air Conditioning

EDISON Brothers Shoes of St. Louis have a chain of over 90 stores throughout the country and in the past they have met with the usual summer resistance to the sale of their product. They realized that the presence of perspiring, coatless salesmen and hot salesrooms were a real detriment to business and that something would have to be done about it. Too many sales were being lost by having customers walking out of the store on the slightest pretext during hot summer days.

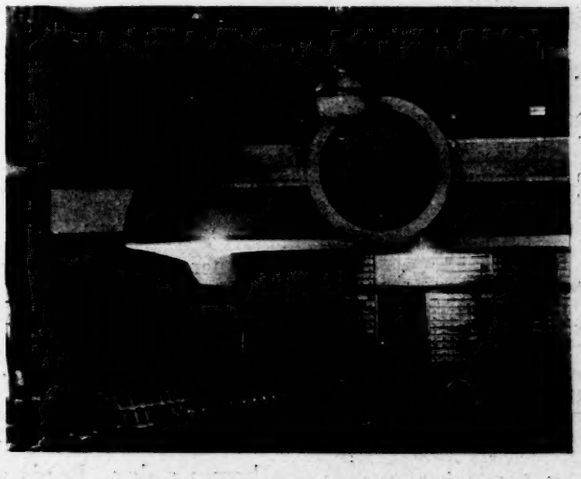
The first record hot spell in Chicago last summer made the company decide to try air cooling in a few of their stores. One of the initial installations was in the Burt's Shoe Store in the heart of the Chicago Loop.

The usefulness of the air conditioning system was well demonstrated during the days when a record outside temperature of 105° was reached. In spite of the fact that the front door was kept open as a 'lure' for prospective customers and window shoppers, the inside temperature was maintained well within the eighties.

Main floor and balcony have a seating capacity of 325 but there are times when as many as 500 people are in the store. When originally designed and remodeled, no provisions were made for a cooling system. As a result, considerable ingenuity had to be exercised in the laying out of the supply ducts so that they would not take up valuable space and at the same time distribute the air effectively.

Several methods were proposed for running the ductwork. The method most acceptable to the management was one where the duct branches in the front part of the store were installed along the balcony railing in back of the rows of seats.

A store room at the rear of the balcony is used as the fan room. Since the 20-ton freon compressor takes up considerable space and is very heavy, it was decided to place it and most of the other cooling apparatus in the basement, some 50 ft. below the fan room. To avoid cutting through the concrete floors, the freon supply and return piping was run next to the wall in a small elevator shaft. Space limitations in the shaft prevented the covering of the pipes but since the temperature difference with freon is not great, condensation is not excessive and is taken care of by having a funnel arrangement welded on at the base of the riser which has a pipe that wastes into a nearby sink.



Interior of Burt Shoe Store, Chicago, showing one of supply ducts in rear

The freon compressor is of the vertical two-cylinder type and is capable of supplying enough refrigerant to the cooling coils to equal the cooling effect of melting 20 tons of ice every 24 hr. Power for driving the compressor is transmitted through a V-belt from an electric motor which is mounted on the same concrete base as the compressor.

After leaving the compressor, the freon is passed through a separator where the oil is removed. From the separator it flows to a condenser where the heat is extracted and the gas liquefied. The liquid freon flows through the pipe in the elevator shaft to the cooling coils which are located in the fan room.

A fan supplies approximately 8,000 c.f.m. of conditioned air to the store through 23 supply grilles and openings. To provide for good distribution, the balcony ducts shoot the air straight up at a velocity of about 200 f.p.m. This cool air rises to the ceiling and slowly falls, flowing throughout the entire balcony and main floor. Other supply air grilles with diffusing vanes distribute the air at the rear and center of the store.

Recirculation of a portion of the air is provided for through a grille set in the wall of the fan room. An adjustable door in the plenum chamber near the fresh air intake is kept open and set to allow any portion of inside air to be drawn into the system and be recooled.

Heating of the store is by concealed direct radiators, installed when the store was remodeled. The blower unit is used for ventilation when cooling is not needed.

The estimated cost of installation was about 10c per cu. ft. of space actually conditioned. The equipment was designed and installed by the Air Conditioning Division of the Vilter Manufacturing Co., Milwaukee, Wis.

The successful experience of the shoe company with the installations made last summer will lead them to have about 60% of the stores equipped with cooling apparatus by next summer. Where new stores are opened, the management will in each case provide for air conditioning, eliminating many of the troubles encountered when the system has to be fitted to an existing store and where remodeling has to be kept to a minimum.

Local FHA Campaigns Under Way

with heating still leading in number of modernizing loans; Organization for Title II being completed.

DURING the 60 days following August 10 American Radiator Company did 40% more business than it did during the corresponding period of 1933. During the first 14 days of October American Radiator business increased 75%.

"The important thing is that our volume has now started up after a decline that began in 1928 and went lower year by year. We are filled with gratitude to the government. Men in the building industry carry in their hearts a genuine and profound appreciation. I have always been a rank Republican, but I take my hat off to President Roosevelt. The Administration has performed a miracle."—Clarence M. Woolley.

An analysis of 2344 FHA loans from key sections[1], classified according to the purposes of the loans as of October 19, shows that heating leads all other classes of modernizing[2]:

	No. Of Loans	% Of All Loans
Heating	997	17.71
Redecorating (interior)	861	15.30
Plumbing	661	11.74
Exterior repairs	555	9.86
Roofing	541	9.61
Painting outside	546	9.70
Remodeling—general	395	7.02
Interior repairs	372	6.61
Cementing	216	3.84
Lighting	163	2.90
Additional rooms	123	2.19
Remodeling—bathroom	121	2.15
Remodeling kitchen	63	1.12
Miscellaneous	14	.25
	5,628	100.00

The number and amount of FHA loans actually made by credit institutions is running ahead of figures officially reported by FHA.[3]

As of October 26, banks reported 24,270 FHA loans totaling $10,485,000. FHA estimates that with private investments, the total spent for remodeling and modernizing reaches $70 million.

Success of the modernizing phase (Title I) of FHA activities seems assured, with local campaigns just beginning to get under way. The building industry, while working on this drive, is also anxiously waiting for the drive on new building which will follow the beginning of operation of Title II.

[1]Broken down by occupation of borrowers the figures show that 16.13% are public employes; 15.27% clerical employes; 13.69% skilled mechanics; sole owners of business, 12.25%; salesmen, 6.78%, and unskilled laborers, 6.14%.

[2]Heating is by far the outstanding item in modernizing loans. One large New York bank which has made 1700 loans shows 771 loans for redecorating; 622 for heating; 581 for plumbing, and less than 500 for each of all other types of work.

[3]The Bank of America National Trust and Savings Association and the Bank of America reported on October 8 1065 loans totalling $410,127.40. Actually, the bank had made 1293 loans totalling $516,000.

In the heating industry, at least, it is obvious that the manufacturers with their own finance companies, or with special arrangements with other finance companies, are making far more headway than those whose contractors and dealers must make their own arrangements with local banks.

Local FHA News

Detroit—Abner E. Larned, chairman of the Better Housing Campaign, has established a downtown clearing house for public information on the FHA program.

San Francisco—A few minutes after 9 a.m. October 15, a score of FERA trained field canvassers, armed with pledge cards and sales literature, set forth from headquarters to contact every property owner in the Richmond district. By the time they have completed their work it is hoped that $7 million in pledges for modernizing work will be obtained. The Junior Chamber of Commerce has completed arrangements to place 75 supervisors in the field to make contact through the more sparsely settled industrial districts.

An old dwelling is being remodeled in the downtown district to display the possibilities of modernizing. Assisting in the campaign are the Chamber of Commerce, civic organizations and banks, women's clubs, and building supply men.

One-third of the advertising space cost of newspaper advertising used by retailers of gas and electrical appliances to promote purchase and installation of such equipment as may be financed under the FHA plan will be paid for by the Pacific Gas & Electric Company, subject to certain limitations.

Sacramento—Reports additional employment to the extent of 1000 in the building trades this month over last. Material dealers extremely busy.

Portland, Me.—City administration in order to further the FHA plan has ruled that no increase in valuation of property for taxation purposes will be made by the city assessment for any repair, renewals, or replacements made to property under the FHA program[4].

Seattle—A clearing house has been established in the downtown district for disseminating information to the public.

Denver—Although more than one out of 10 property owners expect to modernize under FHA plan, very few of these are interested in modernizing their heating plants. Concrete results in the heating and ventilating field consist of five installations of stokers. The lack of interest in heating is partly attributed to the warm winter. A house-to-house canvass of property owners is in progress by 85 surveyors who cover about 1200 homes a day. Leads are referred to general and sub-

[4]A similar action was taken by the city of Somerville, Mass.

contractors. Loans made under the Act in Colorado number about 200.

St. Louis—A modern home exposition will be held here January 5-13 with 400 exhibits.

Chicago—Banks here have made loans totalling $110,822 up to October 20. Of this $64,600 is in the city proper, the rest in the suburbs.

Two antiquated and dilapidated houses were moved into the Century of Progress grounds and one of them was completely remodelled by October 24 and the other left standing in its run-down condition. This event was broadcast.

The Building Recovery Committee of Chicago, composed of real estate men, builders, material dealers, and representatives of service clubs and associations in the North section of the city met October 16 at the Wilson Avenue Y.M.C.A. to plan cooperation with the Chicago Committee, Better Housing Program.

F. J. Lapin, real estate man, chairman of the building recovery body, announced a campaign to be carried on through a house-to-house canvass of homes, stores, and small buildings, to ascertain the amount of work that can be financed by the government plan. The drive will be conducted under supervision of a committee composed of Melvin Nelson, architect; J. L. Stauber, hardware man; W. C. Palmquist, lumberman, and Alex J. Druecker, building materials.

Manufacturers Play Important Part

In volume of loans, the American Radiator Company leads all manufacturers in the whole building industry, had its plan working through its Heating and Plumbing Finance Corporation subsidiary as soon as the FHA plan started. This company has signed up over 5000 cooperating contractors. As the keynote of its campaign, the company is advertising a Budget Book showing how to prepare a budget for all types of modernization, the purpose being to obtain for contractors and dealers (who have copies of the book to distribute) the names of persons planning to spend money for modernization. In the early returns that came through newspaper advertising from more than 4000 persons who expressed an interest in some form of modernization by requesting a copy of the Budget Book, 28% signified a definite interest in heating modernization.

In addition to the national advertising that the company is doing to aid dealers, its program includes a number of specific aids, among them direct mail pieces, a tabloid newspaper to be distributed to homeowners, posters and window banners, newspaper advertising mats, for local advertising, publicity stories to be used in the dealer's name, and a flag to fly in front of the dealer's store announcing that information on remodeling loans is to be obtained there.

Meetings to rally contractor-dealers in support of the Federal Housing movement and induce them to take advantage of its dealer aids, are being held by the company in towns and cities throughout the United States at the rate of about 80 a week. Attendance at the meetings has varied from about 30 persons to 350, depending upon the size of the community.

The Crane Company is reported to have made over $30,000 in loans under the FHA loans, 90% of which has gone into heating equipment.

The Spencer Heater Company early in September announced a new time-payment plan following the provisions of the National Housing Act and acquainted its contractors and dealers with full details and forms. In addition, Spencer is conducting a newspaper campaign in 22 cities, announcing their terms and equipment.

On October 3, Johns-Manville Corporation announced that it will establish 1100 credit agencies throughout the country as part of the National Housing program. The same day, FHA Administrator Moffett announced that the daily peak in FHA loans came Monday, October 1, when 1046 loans, totalling $440,000 were reported. "The curve is moving upward," Mr. Moffett said, "and indications are that the program is being carried on *at the rate of almost $175,000,000 a year.*"

The Johns-Manville credit agency will be known as the Johns-Manville Credit Corporation and will be capitalized at $1,000,000. It is reported that this company's highest loss on credit, even in the worst days of the depression, under its previous deferred payment plan, never averaged more than 2%.

One of the biggest backers of the FHA plan is Sears, Roebuck & Company, which is featuring in a number of cities a full-page newspaper advertisement that its building materials, including heating equipment, can be covered by FHA loans. In a campaign along these lines, the company listed the materials which they sold under the plan. The first half of the list was made up entirely of heating equipment.

Activities of some other companies are:

Richardson & Boynton—Had made 82 loans amounting to about $41,000 up to October 10. Since that time applications have been coming in more rapidly. This company feels that the plan is an excellent one and working satisfactorily, but believes that many bad credits are being passed.

National Radiator—Set up a special plan in August and believes that the FHA plan is on the right track if properly backed up by all interested parties.

Gilbert & Barker—Has gotten out special literature and is sending its bi-monthly publication to 32,000 prospects. Carries its own paper.

A considerable number of companies in the heating and ventilating industry have prepared special folders, mats, posters, window displays, and other promotional material.

Due to the fact that most companies were not organized to take

advantage of the FHA plan immediately, their results to date have been small and they do not wish to be quoted in regard to their activities. These companies, however, are unanimous in believing that the plan is excellent and offers a great opportunity. Reports from such companies follow:

A Stoker Manufacturer—Believes the FHA plan is the best selling aid the company has ever received. Has made 15 loans totalling $7500. Has promotional material on the presses.

A Ventilating Equipment Manufacturer—Enthusiastic about the plan and expects important results.

A Boiler and Furnace Manufacturer—Heartily in accord with the plan. Has handled 75 applications in the first two weeks their plan was in operation, representing about $35,000.

A Rock Wool Manufacturer—Enthusiastically supporting the plan. Has made 50 loans totalling $15,000.

An Oil Burner Manufacturer—A nationally known company, but has no record of the number of loans since distributors are handling the records. Reports that distributors are favorably inclined towards the plan which is working particularly well, except in Boston where the banks have turned "conservative."

A Boiler Manufacturer—Believes the plan is sound and has increased the volume of business. Has prepared special literature but cannot tell how many loans have been made since this is handled through the dealers.

A Stoker Manufacturer — Is using special promotional literature and also the radio. Has issued 20 loans totalling $4500. Reports that the plan is working well in "some locations."

A Steam Specialty Company—"We think the plan is fundamentally sound. . . . Look forward to a definite increase in this class of work next spring."

A Furnace Manufacturer—Reports no apparent direct sales as yet but notices greater homeowner interest in modernizing.

A Steam Heating Equipment Manufacturer—Considers the plan excellent and "the first activity that has ever been put forth with a good chance of success in producing unified activity in promotion of the building industry."

A Furnace Manufacturer—Believes the plan a fine one and reports increase in sales. States that in its home city permits for furnaces during September equalled those in September, 1931. Has made 50 loans totalling $15,000.

The Next Move

So much for Title I of the National Housing Act which is concerned with the modernization of existing homes.

Title II of the Act, expected to go into effect any time as we go to press, has as its immediate objective the relief of the present frozen situation in the building field by creating a more liquid mortgage market. Insurance is to be given not only to existing mortgages but for mortgages on new buildings as well.[5] The activities of FHA will result in long-term financing that is systematically being reduced, and discourage the renewal of mortgages time after time without appreciable reduction of the debt.

As the basis of this plan for financing mortgages is the idea to control construction activities so that they will be conducted on a planned basis, construction will be encouraged only in those cities or localities where studies of the Real Property Inventory reveal an actual need for new construction. Standards for buildings will be developed to insure that structures are sound investments. This may encourage the reliable builder and do away with the "jerry" builder. A careful analysis is being made of building costs and real estate activities.[6]

The organization of Title II will be similar to that to carry out the provisions of Title I. There will be state and local organizations with about 30 or 40 local offices selected from the 64 cities covered by the RPI. Final approval of all applications for mortgage insurance will be given by these offices and state officials. No application will be sent to Washington except for low-cost housing and for operative builders.

Future plans also cover the spending of as much as $2 billion for slum clearance and low-cost housing this winter, according to Secretary Ickes. Congress may be asked to appropriate this amount to PWA for such use. President Roosevelt at a press conference October 17 said that the housing question will undoubtedly be part of the public works program.

All of the PWA fund already appropriated to it for housing has been ear-marked and destined for 39 projects in 33 cities. However, preliminary work has been started in only 8 cases, as follows:

New York—$25,000,000 allocated; options acquired on land for one of several projects.

Chicago — $12,500,000 allocated; 38 blocks condemned for the site of development.

Atlanta — $4,800,000 allocated; demolition of old structures begun on one of two sites.

Cleveland—$3,000,000 allocated; land acquired for project.

Indianapolis—$3,000,000 allocated; purchase of land begun.

Detroit—$6,000,000 allocated; acquiring land.

Cincinnati—$6,000,000 allocated; acquiring land.

Montgomery, Ala. — $320,000 allocated; acquiring land.

There is still an important group of property for which previously mentioned plans do not provide—business properties. Plans were completed late in October by the Reconstruction Finance Corporation for reorganization and refinancing of mortgages on such properties. RFC will supply up to 50% of the capital to organize trust companies for aiding distressed business properties. According to Chairman Jones of RFC, such an organization will make headway in placing on a sounder basis the $35 billion mortgages on urban business properties.

[5]The Act provides for not more than $1 billion insurance on existing mortgages (in existence at the time the Act was passed) and another insurance on mortgages placed subsequent to the passing of the Act.

[6]In charge of Title II will be J. Howard Ardrey, Deputy Administrator and former executive vice president of the Guaranty Trust Co., New York. He will be assisted by R. W. Catherine, formerly with the Bank of Manhattan Company and the New York Title & Mortgage Company.

Don't Neglect Insulation in Modernization Plans

No business-getting campaign of heating contractors and engineers can afford to overlook the possibilities of adding insulation to existing heating and ventilating systems. As a modernization project insulation can assume a position on a par with replacement boilers, conversion burners, zone control, automatic regulation, and other features of what has come to be known as strictly modern heating.

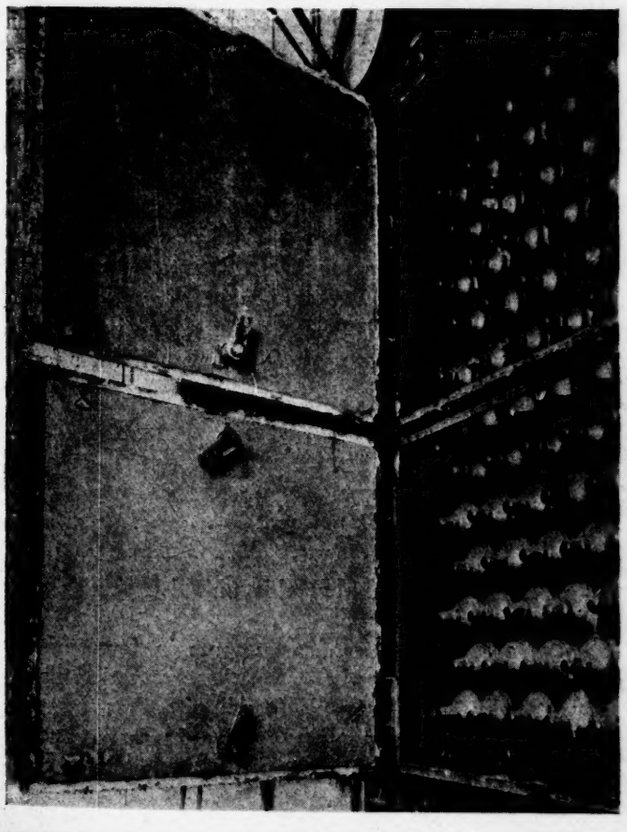
In looking over heating plants nowadays one cannot help noting the increasingly shabby appearance of boiler and pipe coverings. Possibly the causes, aside from lack of available funds for correction, are failure to appreciate the true value of such covering and, second, because the decomposition has taken place gradually over the last five years. Besides remedying obvious decay where found, many heating men look on the present as propitious for the recommendation of rather extensive additions to the common places where insulation customarily has been applied: namely, covering boilers and heat supply lines.

Considering the many virtues of insulation it is really surprising that heating engineers have not stressed it more frequently and included high-grade insulation in more numerous places. That heat loss through roofs and walls of buildings is greatly retarded through the application of surface insulation is a fact known to most of us. Yet many engineers, unless recommending gas-fuelled plants, fail to call attention to the great value of having such protection included as part of the heating specifications. Some possibly feel that surface insulation comes within the scope of general building construction. This need not be true, because numberless heating contractors now are furnishing such materials as a regular part of their work.

Granting that insulation of this type is most easily applied to new construction, it can be properly installed in existing structures without serious problems. Left to general contractors, the insulation is all too often not applied. The natural result is an oversized heating plant, to say nothing of fuel requirements that could be reduced considerably if good grade insulation were in service.

As a modernization project insulation has the advantage that practically every class, size, or style of building can be benefited by it, and this presents to heating engineers and contractors the promise of profitable work no matter in which direction one looks.

Just to review a few of the everyday applications one might cite: pipe and boiler coverings on steam and hot water plants, covering refrigerated drinking water lines, refrigeration lines of all sorts, air conditioning ducts, sound deadening in air conditioning, ventilating, and forced air systems, prevention of sweating of walls and ceilings in over-humid processing rooms, hot water



(Left) Tube clean-out doors on 250-hp. boiler insulated with 2-in. blocks reinforced with metal lath and finished with plastic cement. (Below) Insulating this boiler paid 100% dividend to the owner and secured another order for the insulating contractor

tanks and heaters, underground pipe covering, enhancing personal comfort in modernized basements, increasing undersized boiler heat output, fuel saving, prevention of overheating of undersized boilers, thus reducing fire hazard and prolonging the service periods of boilers, protection of furniture stored in hot basements, cooling of top-floor apartments, cooling of first-floor apartments located over boilers, and similar applications.

It is rather generally conceded that basements of most buildings, especially office buildings, apartments, and factories, are overheated. Although physical comfort of engine-room employes is disregarded, as it usually is, building owners are willing to consider insulation of heating plants and lines to prevent stored furniture from falling to pieces. Tenant protests frequently are commands to have the necessary remedy applied without delay. Owners rarely have to work in 120° basement temperatures so they are not prone to visit below ground unless necessary. Yet they know that such temperatures most assuredly cause pulling apart of chair rungs, shrinking of upholstery, and like abuses to tenants' stored goods.

An elite apartment dwelling at 1115 Fifth Ave., New York, not long ago had a tenant who resided on the first floor directly over the heating boiler. Her apartment customarily was uncomfortably warm from October to May. She threatened to move and the owner summoned a heating contractor with a view to insulating the basement ceiling over a considerable area. The latter, however, advised covering the boiler with thicker, higher grade material instead. Before the work was three-quarters finished the tenant's complaints ceased and her lease was renewed to the profit of the owner, who also saved a substantial amount of coal.

"La Rochelle," florist, New Rochelle, N. Y., used to have to purchase 13,000 gal. of oil per season at 7 cents per gal. to heat its greenhouse range before proper boiler covering was applied by an active heating contractor. The old fuel bill was $910 yearly. The cost of the covering was $215. Now the fuel bill per season is but $600, representing a saving of $310, or a net saving on fuel of $95 clear the first heating season.

Its heating load is 857,000 lb. of steam yearly, the old cost being about $1.06 cents per 1000 lb. of steam before insulation. Now each 1000 lb. costs but 70 cents.

Two years ago the Richmond Floral Co., Staten Island, N. Y., ordered the reinsulation of one of its 135-hp. coal-burning H.T. low-pressure boilers, the cost being about $460. During a single season the owner reported that he had saved more than this amount. This record brought the contractor an order for covering a 150-hp. boiler at the same place.

Records like the foregoing might be cited indefinitely. But the chief point to be considered is that under current modernization progress building owners look with most favor on those improvements that reduce operating expenses. Anything, either materials or labor without materials, that will bring expense relief to owners is in active demand. In fact, modernization of the money-saving sort is held by many to be the easiest means to get new work at present.

It is ventured to suggest that gas-fuelled heating would not have made as great progress as it has without the aid of surface insulation. The same might be said of air conditioning, although perhaps to a lesser degree. Surely insulation is vitally necessary to the satisfactory operation of refrigeration apparatus. So widespread has been the demand for insulation that there have come into being in every sizable city contractors and engineers whose sole business is planning and applying insulation in its many phases.

This situation has been brought about for two reasons. First, because of the expanding appreciation of the product and, secondly, because of the rather general diffidence of regular heating and ventilating contractors and engineers to the profit possibilities of insulation.

The sharp business sense of the few others acquires advantage from the indifference of the many, who more properly should be concerned with the insulation end of heating and ventilating. Considering the possible savings in operation of heating, ventilation, and air conditioning, one need not hesitate to submit insulation proposals that include substantial profit. Building owners with ordinary common sense usually are willing to spend well on modernization materials and workmanship when financial returns thus made possible equal the investment in a single season, or at the most, two seasons. Heat loss factors with, and without, proper insulation are numerous. These data should be adequate as selling arguments. Surveys reveal the points where covering profitably can be applied. Then submit authoritative figures on economy to be effected. Owners who know values quickly recognize their force.

Contractors Form General Contracting Partnerships

A GENERAL contractor who is qualified to give an accurate estimate and prepared to deliver a thoroughgoing modernization job complete in all its details to a property owner has a distinct advantage over the independent heating contractor, carpenter, or mason in landing his contract, according to the Federal Housing Administration.

In consequence, these independents, together with the electrical, sheet metal, and other contractors in cities where the Better Housing movement is now beginning to operate, are banding together and forming general contracting companies on a partnership basis. Early reports indicate that this united action is producing gratifying results.

There are a number of arguments in favor of the one flat, all-inclusive estimate on the cost and the subsequent delivery in "capsule form" of a first-class job of a renovation, as against separate negotiations of contractors who are familiar only with the business of the trades they represent.

Mail Order Competition Stiffens

with Sears and Ward selling complete heating lines, increasing their installing business

THERE has been no bed of roses for the plumbing contractor for years. Department stores, mail order houses, "gyp" jobbers, and public utilities all nibbled at this part and that part of his business. It is true that many utilities adopted cooperative plans and a conciliatory attitude which are working satisfactorily. But the other competition continues to grow, caused N.A.M.P.'s President Calnan to deplore the fact that plumbing laws are being violated through the by-passing of the legitimate trade channel.

The heating contractor has been threatened with similar outside competition and, in some localities, suffered from it. The "dealer," successful in selling oil burners, for several years has been branching out into air conditioning. In some cases the contractor is contracting to install equipment sold by the dealer, who naturally sublets at low figures.

Mail order house competition in predepression days disturbed contractors but little, in main resulted in loss of low value business. Even the establishment of retail stores failed seriously to bother the contractor.

With new building at extremely low levels, with modernizing a main source of business, two recent moves by Sears, Roebuck and Montgomery Ward are significant, will disturb contractors more than ever:

1. Widening of the lines of heating equipment carried by the two mail order concerns, and
2. Increased aggressiveness of the mail order retail stores in selling and installing heating equipment.

The 1934-35 catalogs issued by the two major companies late in August had more heating items than ever before. Both companies have been selling oil burners, recently introduced stokers nationally. Catalog prices are, for many items, below or perilously near what the contractor can buy them for (the table lists typical prices).

A two-page spread in the Sears heating and plumbing catalog—"Hercules Systems Easily Installed"—reports that the great majority of the customers install their own heating systems, find the work simple and easy.[1]

In case the customer does not care to do the work, Sears recommends hiring a handy man at a "reasonable" working wage, warns that an experienced steamfitter is not necessary.

Montgomery Ward also publishes a similar catalog advertising equipment much the same as Sears, offers the same service of supplying plans, cutting, and threading pipes. Regarding the services of the engineering department the catalog says: "All of this valuable advice is free, and is given to you before you spend a cent."

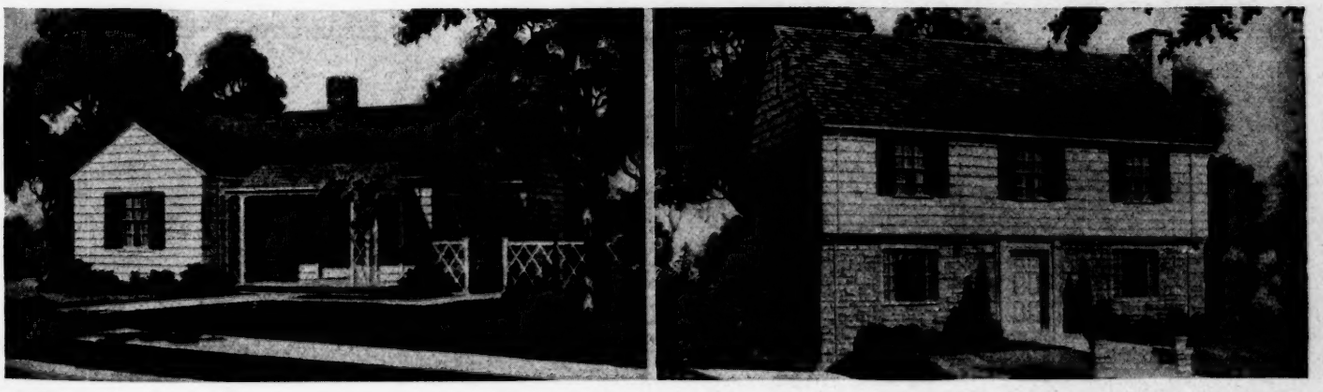
Sears, Roebuck has been quick to recognize the possibilities of the National Housing Act and is backing it with a series of full-page newspaper advertisements. These ads appear in practically all cities where Sears have retail stores.[2]

Besides cooperating with the banks to arrange for modernization loans, both mail order houses offer an easy payment plan, available through catalog and retail purchases alike. In this and many other respects the two mail order houses offer practically identical services. Approximately 10% is added to the cash price of the

(Concluded on page 66)

[1]One customer is quoted as saying that the work is "irresistibly interesting." Prospects are told that installing amounts to nothing more than a little substantial exercise, and after the job is done they will feel the better for it.

[2]Good example: Page in the *Cleveland Plain Dealer*, Sept. 23, headed "The National Housing Act Makes it Easy to Save at Sears." Announces that Sears' four Cleveland stores and the Cleveland Trust Company will finance modernizing under FHA plans. Sears has formed its own finance company, Sears Finance Corporation.



A Sears "cut and fitted" (but not erected) home—The Salem—price, $908, is shown at the left. A steam system will cost $183 additional, a warm-air plant $160, and a hot water system $220. Right, The Alden, the Sears' de luxe home, costs $2418 cut and fitted. A steam plant for this house costs $486, hot water $550.

What is the Heating Industry;

is stove pipe the same as furnace pipe; what is a register body? NRA considers these questions, considers definitions.

CONVENTION orators for years have spoken proudly of "our industry," referred bitterly to pernicious activities of other "industries." What an "industry" is has been taken for granted even though the word has been loosely used[1], misused, and over-worked.

The heating industry is understood to include everything and everybody connected with heating-manufacturing and manufacturers, contracting and contractors, engineering and engineers, jobbing and jobbers, sales and salesmen, and so on and so on.[2] Is there a heating manufacturing industry, a branch of the heating industry? Is there a heating salesmen's industry? If so, does a sales engineer, for example, belong to the heating manufacturing industry or the heating salesmen's industry? Or is he just a part of one huge salesmen's industry?

Such questions, with their semi-legal twist, bore most men, and seem of little consequence. But with NRA came necessity for clearly defining terms and words relating to functions, equipment,[3] trade practices.

When NRA approved the Heating, Piping and Air Conditioning Contractors Code July 25, it was specified that Article I[4] was approved on condition that it be reviewed or reconsidered 60 days after approval. This period was later changed to 90 days. The public hearing to discuss the definition of the "industry" has now been scheduled, the date set for November 6. At the same hearing, Deputy Administrator Robert N. Campbell will consider the provision prohibiting selling below estimated cost.[5]

Thus, contractors are now definitely involved in the subject of definitions to the extent of determining what their "industry" really includes and what makes up their "cost."

If anyone still doubts that definitions are not of concern to heating men, let him examine an application to NRA from furnace pipe and fittings makers.[6]

The Code Authority of these manufacturers submits the following definitions to NRA:

1. Flue pipes are pipes through which hot air, smoke, or other gases are conveyed away.

2. Stovepipes and stove-elbows are metal pipes used for conveying away smoke and other gases.

3. Stovepipes are in all respects similar to furnace pipes including the purposes for which they are made and used, the materials of which they are manufactured, the method of manufacture and distribution.

4. Although so-called stovepipes and stove-elbows are in all respects similar to furnace pipes and furnace elbow pipes, pipes and elbows made of black iron or steel are commonly referred to in the industry as stovepipe, whereas similar pipe and elbows made of galvanized iron or steel are commonly referred to in the industry as furnace pipes and elbows.

5. Stovepipes and elbows are manufactured principally by firms engaged in the manufacture of furnace pipe, elbows, and fittings.

These points are submitted with the purpose of amending the definition of the furnace pipe and fittings industry to include stovepipes and elbows, and any objections to this amendment were to be forwarded to Deputy Administrator Beverly S. King not later than October 27.

Mr. King also gave consideration during October to a petition from the furnace manufacturers Code Authority asking for approval of its proposed manual of cost accounting. The manual "does not impose upon the industry a mandatory system of cost accounting," but advances "cost principles" to be followed regardless of individual companies' cost and accounting procedures.[7]

During the week ending October 13 plans for the organization of agencies and procedure for the handling of trade practice complaints were approved for the Cast Iron Boiler and Cast Iron Radiator Industry, the Plumbing Contracting Industry, and the Heating, Piping and Air Conditioning Contracting Industry.[8]

On October 17 NRA approved the Trade Practice Complaints for the Unit Heater and/or Unit Ventilator Manufacturing Industry, the committee to consist of not less than three code authority members.

On the whole, there was little code activity during October, with the principal events as follows:

Air Filter—An amendment to the supplemental code, recognizing the Subdivisional Code Authority elected under the general code for the machinery and allied products industry before the supplemental code was approved, has been submitted by the subdivision. Suggestions or objections concerning it are to be submitted to Deputy Administrator Beverly S. King before November 12.

Steam Heating Equipment Industry—On September 21 NRA approved an amendment to this industry's code which makes it possible for the industry to obtain recognition of its Code Authority regardless of the fact that non-association members of the industry do not choose to elect a representative to the Cody Authority.

The Code Authority members of this industry, recognized by NRA October 9, are: E. K. Lanning, Warren Webster & Company; Barrett Scudder, Jas. P. Marsh Corporation; W. K. Simpson, Hoffman Specialty Company; E. J. Ritchie, Sarco Company, Inc.; J. C. Matchett, Illinois Engineering Com-

(Concluded on page 58)

[1]Example: The heating "industry" supposedly includes gas heating, yet gas heating is part of the gas "industry."

[2]Webster defines an industry as "any department or branch of art, occupation or business; especially, one which employs much labor and capital and is a distinct branch of trade."

[3]An amendment adding "register bodies" to the products covered by the code for the warm-air register industry was approved by NRA October 8. The amendment defines a register body as "the frame that attaches to the body of a register face, in which frame are suspended pivotal mobile louvers which are opened and closed with an operative device, either vertical wheel, slide, guide, or other movement, or other manual opening and closing device, which register body when attached to the face constitutes a complete register. This register body as described may be either of steel, cast iron, or other metal."

[4]This article defines the "industry, its scope, activities outside its jurisdiction, and similar points."

[5]And which in the code approval order was scheduled for rehearing in 90 days. The provision (Article IV, paragraph D) reads: "No member of this Division shall agree to furnish or sell labor, materials, fixtures, apparatus or installations for any job at less than the estimated cost thereof. In connection with this rule estimated cost is defined as the sum of the estimated cost of labor including liability and compensation insurance, and cost of material including freight and cartage, filing fees, and any other direct expense applicable to the job and an amount for overhead. The amount for overhead shall not be less than 12½% of the combined cost of labor including liability and compensation insurance, and the cost of material including freight and cartage. It shall be a defense to any charge of violation of this paragraph if the part charged shall satisfy the Administrator that his bid was not less than the estimated costs of any other member of the industry."

[6]Formally and impressively known as the Warm Air Furnace Pipe and Fittings Manufacturing Industry subdivision of the Fabricated Metal Products Manufacturing and Metal Finishing and Coating industry.

[7]The manual is an 8-page mimeographed booklet, available from the Code Authority, 5 East 8th St., Holland, Mich.

[8]Consisting of Walter Klie, chairman, 6107 Carnegie Ave., Cleveland; Maurice J. Chagnard, 821 East Jefferson St., Louisville, Ky.; George H. Dickerson, 162 North Clinton St., Chicago; J. I. Lyle, 850 Frelinghuysen Ave., Newark, N. J.; and Thomas O'Callaghan, 13 Hawkins St., Boston.

Ventilating and Heating of a Modern Farm Building Group

(Conclusion)

By ALFRED J. OFFNER, M.E.†

The Ventilating Systems

All the barns and stables, both for the cows and horses, have both air supply and air exhaust ventilating systems.

The air supply, which is unheated in every case, is taken into the building either through openings located on the outside face of the walls or through dormer windows located on the roofs of the buildings. The air is introduced into the barns and stables in every case near the top of the room, either through openings located on the face of the wall, or direct through the ceiling.

All air supply intakes are provided with louvers and screens, giving free entry for the air but preventing rain, birds, leaves, etc., entering the air supply systems. All air intakes further have the usual automatic back pressure dampers to prevent the reversing of the flow of air under adverse wind action. The air openings into the rooms can be closed, opened, and controlled by hand.

The vitiated air is removed from the barns and stables through openings located on the face of the walls, both near the ceiling and near the floor.

Both exhaust openings are under manual control, so that either all the air can be taken out at the top of the room or all out at the bottom, or partly top and partly bottom. In the stall section of the horse stable, both openings have key-operated louvers, permitting air control, while the bottom openings in the box stall section have vertical iron bars in place of the register faces. In the cow barns, on account of their closeness to the cows and the possibility of contamination by the animals, the lower openings are entirely open, having no grille or bars over same, and further are finished in hard cement to permit easy cleaning and washing-out. The top openings have register faces only. The air control in these cases is by means of a flap damper located in back of the top opening and operated from that point. Fig. 5 shows a typical section through an exhaust flue located in the cow barn, and indicates the method of control.

The air is removed from the barns by ducts and flues placed in the walls and attic spaces, and is discharged by means of fans to the outdoors through ventilators located on the roofs of the buildings. The exhaust fans are of the propeller type, electrically driven by direct connected electric motors, and generally are located under the ridges of the roofs. The exhaust fans have three speed controls, giving approximately 90%, 75%, and 60% of synchronous speed. They can be controlled, as to starting and stopping, either manually or automatically.

In the attic spaces where hay is stored, vent openings are provided into the exhaust systems to remove air during warm weather when the hay is fresh, and also to prevent rotting of the hay should it become wet.

Automatic Control

In the cow barns and in the horse stables, the ventilation and also the heating, where provided, can be independently started and stopped by manual control,

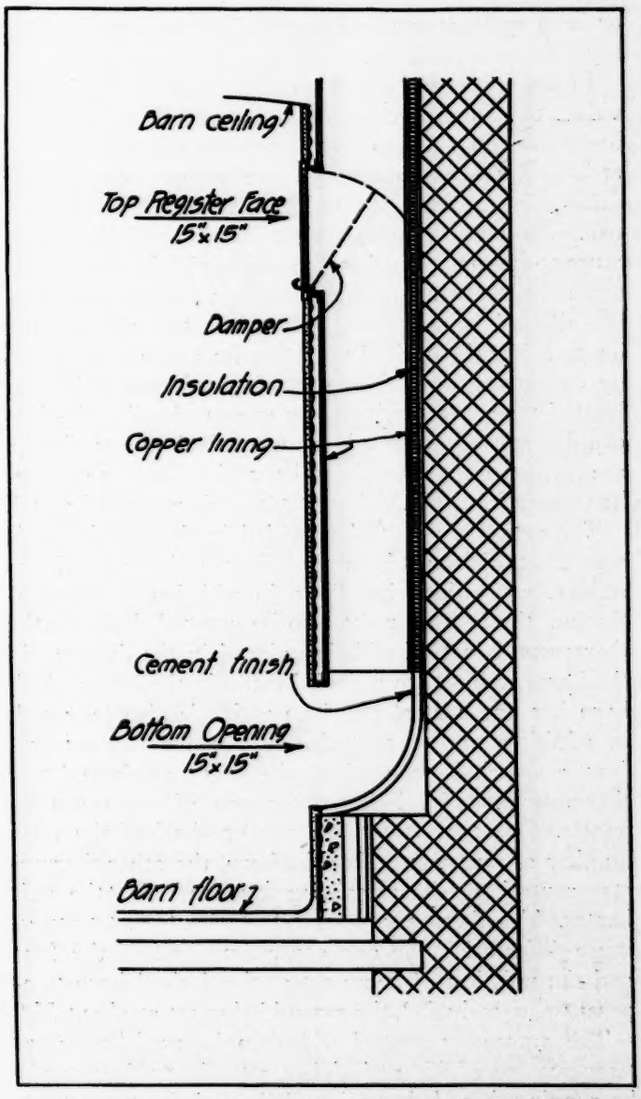


Fig. 5. Section through exhaust opening showing method of control

†Consulting Engineer, New York.

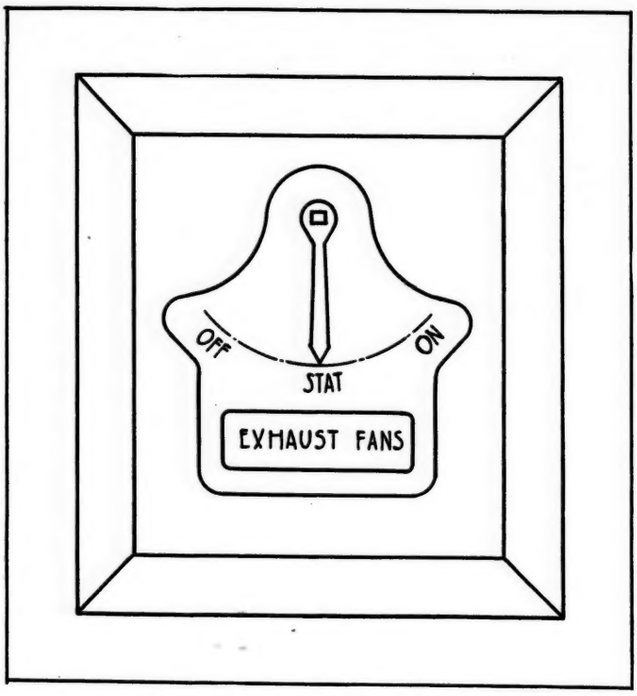


Fig. 6. Exhaust fan control panel

or both systems can be controlled automatically either together or separately.

In the horse stables, where only ventilation is provided, the automatic starting and stopping of the exhaust fans is actuated by thermostats located in the attic and placed directly in the exhaust ducts from these rooms. Each fan unit has its independent control. These thermostats are set for the desired temperature to be maintained in the stable, the fans operating when the temperature of the stable is at, or higher than, the desired temperature, but when the temperature drops below the desired point the fans then stop, thereby conserving heat. The control panels, on which are located the control switches by means of which the fans can be started, stopped, or controlled automatically, are located on the stable walls, at heights for convenient operation. Fig. 6 illustrates such a control panel.

The automatic control provided in the cow barns is somewhat different from that described for the horse stables, as in these buildings, in addition to the ventilation, the heating must also be controlled. Here the thermostats, instead of being placed in the ducts as in the horse stables, are placed directly in the barns. Each barn has one control panel on which is also mounted, in addition to the control switches for the exhaust fans, a switch for controlling the heating unit and two thermostats. Fig. 7 illustrates one of these control panels. One thermostat controls one-half of the total number of fans ventilating the barn, the other thermostat controlling the remaining fans and also the unit heater. The thermostats are set at about a 5° temperature differential, the one controlling half of the fans and the unit heater being set at the desired barn temperature, namely 50°, the second being set at about 55°.

The automatic control will then be as follows: at temperatures of 55° and higher, all exhaust fans would be running, heat being off, and the unit heater not operating. When the barn temperature starts to drop and reaches 55°, one-half of the exhaust fans stop running, reducing the amount of cold air being pulled through the barn, and thereby starting to conserve heat. The heat would still be off. When the barn air drops to the desired temperature of 50°, the second set of exhaust fans stops and the heat goes on, there being a 1° to 2° lag between the two operations. The heat stays on until the desired temperature is reached, and if the temperature keeps rising, the heat turns off and the control of fans operates in reverse to that just described. When the heat is on and ventilation is also desired, the fans can be put in operation manually. As in the horse stables, both ventilation and heating can also be controlled by hand.

Condensation

Due to the high relative humidities and low air temperatures encountered in farm buildings, special consideration must be given to the prevention of condensation forming on exposed walls, ceilings, etc. Damp and dripping walls and ceilings not only cause deterioration of the building structure and contents, but also affect the health and efficiency of the animals housed therein.

Condensation on a surface is caused by the contact of warm humid air with surfaces that are below the corresponding dewpoint temperature. Condensation can therefore be eliminated either by reducing the humidity so that the dewpoint will be below the temperature of the surface with which the air comes in contact, by increasing the surface temperature to above the dewpoint, or by adding heat resistance to the construction.

The total amount of moisture or absolute humidity in farm buildings depends on the kind, number, and

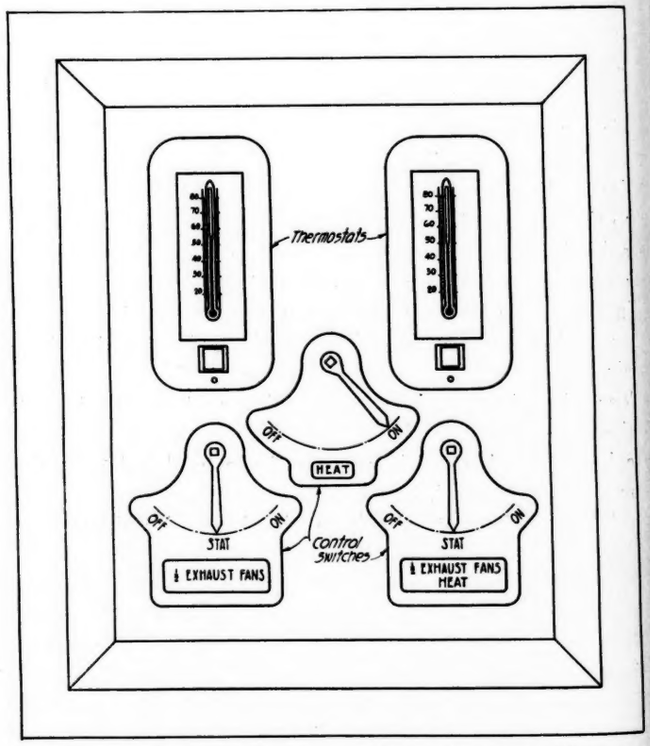


Fig. 7. Control panel in cowbarns for controlling ventilation and heating

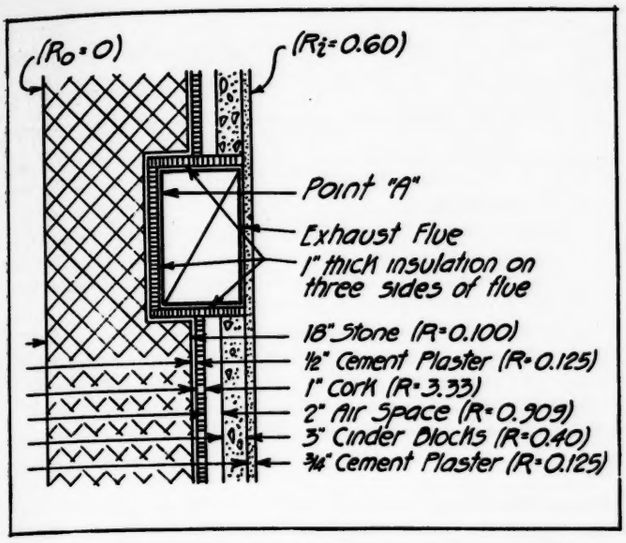


Fig. 8. Wall construction showing heat flow coefficients

size of animals housed, on the humidity of the incoming air, and amount of ventilation provided. As a basis for calculating the structural resistance to condensation in the farm buildings under discussion, a relative humidity of 85% was assumed, with a barn temperature of 50° dry bulb and an outside temperature of 0°.

In order to determine the total resistance R which the various exposed structural parts of the building, such as walls, ceilings, etc., must have to maintain the interior surface at a temperature higher than the dew-point temperature corresponding to 85% relative humidity, the following formula[3] was used:

$$R = \frac{R_s\,(t - t_o)}{t - t_s}$$

in which R is the total resistance, R_s (= 0.6) the interior surface resistance, t is the inside temperature, t_o the outside temperature, and t_s the temperature of the interior surface.

For all surfaces exposed to the outside air the total resistance to prevent condensation would then be

$$R = \frac{0.6 \times 50}{50 - 45.7} = 7.00$$

[3] "Preventing Condensation on Interior Building Surfaces," by P. D. Close, A.S.H.V.E. Transactions, Volume 36, 1930.

The actual wall construction is indicated by Fig. 8. Using the resistances as given in the Guide of the A.S.H.V.E. for 1932, the year the work was under design, the total resistance of the wall is as follows:

18 in. Stone	18 × 0.10	= 1.800
½ in. Cement Plaster	0.5 × 0.125	= 0.063
1 in. Cork	1 × 3.33	= 3.330
Air Space		= 0.909
3 in. Cinder Blocks	3 × 0.40	= 1.200
¾ in. Cement Plaster	0.75 × 0.125	= 0.094
Total Resistance (R)		= 7.396

As the actual total resistance 7.4 of the wall construction is slightly greater than the calculated required resistance of 7.0, this indicates that theoretically no condensation should form on the inside of the walls under the assumed conditions. Actual results obtained have checked with these conclusions. During the time the buildings have been in actual use, and under various low temperatures and high humidity conditions, condensation has never been found on any of the barn walls.

In connection with the vertical exhaust flues concealed in the outside walls, and as also illustrated by Fig. 8, it is of interest to note that, up to the side of the flue adjacent to the outside wall (point "A") the total resistance figures as 4.90, which is less than the required total resistance of 7.00. Therefore, at outside temperatures below 15°, theoretically, condensation should form on the inside of these flues and trickle on to the floor through the bottom openings. Actually, no condensation has ever been observed to form in any of the flues. This is probably due to the fact that part ventilation is maintained while artificial heat is provided, thereby reducing the relative humidity in the barns to below the 85% assumed.

For the ceiling construction, with an unheated attic space above assumed to be at a temperature of 30°, the total resistance required to prevent condensation figures as 4.0. The ceilings over the cow barns consist of plaster backed by insulation, the total resistance of which figures as 4.2. Therefore, theoretically, no condensation should form on the ceilings, and during actual use of the buildings none has ever been observed.

Control of Air Flow in World's Largest Tunnel

THE Mersey Tunnel, opened in London in July, 1934, is the world's largest vehicular tunnel. Because of great size and length, large amounts of air have to be supplied to the tubes. Special instruments were constructed in order to regulate the amount of air being supplied and exhausted. The meters, which are located at 16 points throughout the supply and exhaust shafts, are capable of measuring 5 million cubic feet of air per minute. Half of this is supply air.

The readings of the meters are transmitted electrically to the indicators, which are located in the switch rooms, and to the recorders in the central control room. With these instruments it is thus possible to see what amount of air is being supplied to or exhausted from each point of the tunnel at any moment, thus enabling the input and output to be balanced, and also giving a record of the air flow at each measuring point.

The meters have been designed for maximum velocities ranging from 55 ft. per sec. to 20 ft. per sec., and to indicate and record accurately down to 15% of the maximum velocity in each case; above 15% of the maximum, the readings to within 5%, so that velocities as low as 3 ft. per sec. are measured with this order of accuracy.—*From "Engineering" (London)*

ABSTRACTS of Current Papers, Books and Pamphlets

Machinery's New Handbook

MACHINERY'S Handbook contains the mathematical tables, rules, formulas, general data, and established standards used in shops and plants where all classes of machines or other mechanical devices are designed and manufactured.

The Ninth Edition has just been published in order to include new or revised standards of particular importance in machine design and construction, and miscellaneous mechanical data representing recent developments in engineering and manufacturing practice. This is in line with the publisher's policy of revising MACHINERY'S Handbook as frequently as is required to include important new or revised standards, as well as other matter definitely known to be used throughout the mechanical field.

Since 1930, 367 additions and revisions, large and small, have been made, and the Ninth Edition alone contains 172 revisions and improvements ranging from complete new sections to small but very important changes for engineers.

Unfortunately, it is impossible in a condensed review to give one not familiar with MACHINERY'S Handbook even a general idea of its scope. It does, however, contain the tables, formulas, and general information which in one way or another are related to the design or manufacture of practically every type of mechanical product. The Handbook is divided into 126 main subjects, and any one of the many thousands of items in these main divisions may be located readily by referring to an exceptionally complete index.

[*"Machinery's Handbook—Ninth Edition"; Erik Oberg and Franklin D. Jones, Editors. Published by The Industrial Press, 148 Lafayette St., New York; 1592 pages; 4½ in. × 7 in.; price,* $6.]

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Handbook of Chemistry and Physics

The 19th edition of the Handbook of Chemistry and Physics, representing a 21-year accumulation of data of interest to the busy engineer and chemist, has appeared. The book contains the most up-to-date information available on all branches of chemistry and physics.

Many important additions and changes have been made, both in arrangement and material. The book is now divided into five sections, each having its own table of contents preceding it. A complete table of contents appears in the front of the book and a cross index in the back. Some of the new tables of interest to heating engineers are thermodynamic properties, heat of combustion of liquid fuels, and density of moist air.

Included in this new edition will be found 274 pages of mathematical tables and formulas, 44 pages on the properties of matter, 146 pages on heat, 114 pages on sound, electricity, and magnetism, 70 pages on light, 283 pages of measures and units, and in addition many other pages of information on chemistry and physics.

[*"Handbook of Chemistry and Physics," 19th edition, published by The Chemical Rubber Publishing Co., Cleveland, Ohio.* 1934 *pages; 4¼ in. × 6½ in.; price,* $6.]

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Chemical Formulary

Persons with a theoretical knowledge of chemistry often encounter difficulty in producing a useful product from raw materials. This is especially true when the final product is not a definite chemical compound but is a mixture, blend, or highly complex chemical substance. To help these men and also to help those who desire to produce substances in fields unfamiliar to them is the purpose of this book. It is a condensed collection of timely and practical formulas for making products in all fields of industry.

Because of the wide variety of products covered, leading chemists and engineers were consulted in the selection of the formulas. They are up-to-date and cover many of the latest developments in industry.

Heating and ventilating men will be especially interested in the formulas relating to air conditioning water treatment, boiler compounds, removal of boiler scale, soot destroyers, rustproofing, paints, coloring coal, fuel briquets, welding, soldering, and fireproofing.

[*"The Chemical Formulary," published by The Chemical Publishing Company of New York, 175 Fifth Ave., New York; cloth-bound; 5½ in. × 8½ in.; 595 pages, not including advertising; price,* $6.]

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Refrigerating Data Book

The 1934-36 edition of the Refrigerating Data Book is in much the same form as the first edition. The arrangement has not been changed so that the user of the previous edition will encounter no difficulty in referring to the new edition. Wide changes have been made, however, in the material included. Approximately 48 pages have been added and 11 of the chapters are either new or entirely rewritten. Only one-third of the first edition has been reprinted without change.

While the chapters on psychrometry and air conditioning occupy the same number of pages, they have been entirely rewritten. The material has been condensed considerably and the arrangements improved. New and additional material on climatic data, air changes, and cooling loads has been added.

Heating and ventilating engineers and contractors will find that the changes have made this edition even more valuable than the previous one. In the short time since the appearance of the first edition the book has become a standard reference for information on refrigeration and it is felt that the newest edition will become even better known.

[*"Refrigerating Data Book," published by American Society of Refrigerating Engineers, 37 West 39 St., New York: fabrikoid-bound, with advertising pages and membership list appended; 6 in. × 9 in.; 476 pages; price,* $3.50.]

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Standard for Domestic Burners

The Department of Commerce in cooperation with users, contractors, and manufacturers has established and adopted a standard to serve as a basis for certification of quality and performance of underfeed domestic burners for Pennsylvania anthracite. The requirements were made as broad as possible so as not to become a handicap to future improvements. The standard is intended to protect the burner manufacturer, the installing contractor, and the purchaser from unfair competition by providing a basis of common understanding for the determination of burner quality and performance.

The standard applies only to underfeed type burners installed for heating buildings, using Pennsylvania anthracite and having a normal capacity not to exceed 50 lb. per hr. It became effective for new production August 1, 1934.

[*"Domestic Burners for Pennsylvania Anthracite," Commercial Standard CS48-34, National Bureau of Standards, U. S. Department of Commerce; paper-bound; 6 in. × 9 in.; 12 pages; price* 5c. *Obtainable from Superintendent of Documents, U. S. Printing Office, Washington, D. C.*]

EDITORIALS

Insuring Economic Soundness in Dwellings

Under Title II of the Federal Housing Act the Administrator is given broad powers to prepare rules and regulations to control the granting of insurance to certain amortized mortgages on dwellings both existing and new. The Act also states that "no mortgage shall be accepted for insurance under this section unless the Administrator finds that the project with respect to which the mortgage is executed is economically sound."

This latter provision clearly places an injunction on the Administrator to determine just when a given project can be considered economically sound.

It is easy enough to see that this requirement of the law presents the Administrator with a problem of no mean proportions. Just when is a project economically sound? What are the factors on which its soundness can be judged in advance? What relative weight is to be attached to them? Are there certain minimum requirements which can be set and evaluated? Many of these questions are posers and the detailed regulations will be watched for with interest.

To our mind there is one set of facts in connection with the soundness of a project which cannot be ignored. They have to do with the soundness of the mechanical equipment put into the building. How can a building project be economically sound unless it includes enough of the comfort features of living so that someone will actually want to live in it during the life of the mortgage? Unfortunately, structural strength and like factors have usually been given consideration to the virtual exclusion of the mechanical equipment when buildings have been rated for soundness in the past. We wonder if the Administrator in drawing his regulations will recognize adequately the growing importance of the mechanical equipment, and especially of adequate heating, as a factor in making a dwelling house economically sound as an investment. He has the opportunity—even the injunction—to do this.

This raises the further question of who is to do the actual evaluating. We, who are close to the equipment, know well that there is but one person capable of doing so or worthy of consideration for the task. He is the trained and experienced engineer. There are men of this kind available. Let us hope that the regulations provide for using their services as they should be used. If that is done there will be some real assurance that when a project is rated as "economically sound" it will actually be so.

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Thankfulness—and Brightening Prospects

November and December are months when the year-end prophets usually start casting an appraising eye about to line up their ideas and get their statements ready for release at the beginning of the new year. Moreover, the Thanksgiving season is upon us and now is the time to give thanks for those blessings already at hand. While we do not expect to enter the fold of new-year prophets nor to prepare statements for delivery at Thanksgiving, still we cannot help but note that there is much material at hand for anyone who wishes to do either.

With modernizing campaigns under way in many cities and with loans under the insurance feature of FHA being made, the initial (or Title I) portion of the housing law is in operation. This is cause for rejoicing, especially as heating equipment is accounting for a surprisingly large portion of the loans made so far. Besides this the volume of new building construction for the year has been notably better than that of the year previous. All this we can be definitely thankful for as already accomplished facts.

When the prophet examines his material he naturally finds it a little indefinite but that is a penalty for being a prophet. Nevertheless, he can forecast some events even now with reasonable assurance.

One of these is that the attention paid to modernizing is slowly but surely arousing a general interest which goes way beyond the limits of the present Federal plan. A considerable amount—there is no way of knowing how large—of modernizing is being done entirely outside and independent of the Federal plan and directly traceable to the steady pressure of publicity. This kind of work requires no insurance fund and is privately financed. It was already beginning to appear before the FHA was even proposed. Far from stopping or retarding this situation, the Federal move with its partial payment plan is virtually certain to stimulate and increase it. There is evidence that this is happening even now.

Another point which is significant of things to come is that already there is grumbling because the loans insurable under Title I of the Act are limited to $2,000. Those who would like to borrow more are asking why such a limitation is necessary. This presages a move to get the limit raised and in view of the reasonableness of the point it stands a good chance of passing Congress this coming winter. The effect should be a considerable increase in volume and a widening of the scope to take in larger work.

Now, too, comes word that Title II of the Housing Act is ready. In the opinion of many it strikes at the real trouble in the building industry as a whole for it sets up machinery for financing new construction as well as for dealing in mortgages on existing buildings.

With these accomplishments and these promising developments all of us have much to be thankful for and much reason to feel confident of what will be with us soon.

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Why Make Any Predictions?

It is announced that the Carrier organization is to air condition (with cooling) one of the most famous of the deep gold mines of South Africa. As this is expected to permit deeper mining, the effect is to increase estimates of the available gold supply, and to influence gold somewhat as would the discovery of new veins. Ultimate effects on money and prices may easily be great and far-reaching. Here is a striking example of how widespread and revolutionary the application of air-conditioning may be. No one yet knows by a good deal how far or in what directions it may finally go.

The effect is similar in a way to what happens when any new process applied to the extractive industries permits opening up additional supplies. Cases in point are the new methods of drilling which have so vastly increased the supply of both oil and natural gas. All such developments are most discouraging to predictions and show how little use there is in preparing long-term forecasts predicated on the continuance of present conditions.

NEWS OF THE MONTH

Tapp Resigns as Secretary of AOBA

NEW YORK—Harry F. Tapp, executive secretary of the AOBA for the past 5 years has resigned. His resignation was presented at the recent meeting of the directors of the association who accepted it with regret.

Prior to 1929 Mr. Tapp was technologist of the association for two years and previous to that had been connected with the Socony Burner Corporation. He was responsible for both handbooks on oil burning which the association published, the second edition of which particularly met with wide acceptance. He was also largely responsible for a campaign combating erroneous newspaper reports referring to oil burner explosions and against misleading and inaccurate advertising. He also did considerable work in connection with a uniform ordinance in towns and cities covering installations.

Mr. Tapp has not as yet announced his plans for the future.

Carbondale to Use Worthington Facilities

HARRISON, N. J.—Following the consolidation of interests of the Carbondale Machine Co., Carbondale, Pa., with the refrigeration business of the Worthington Pump and Machinery Corporation, reported on these pages last month, announcement has been made that the combined refrigeration business will be known in the future as the Carbondale Machine Corporation.

The Carbondale Machine Corporation will transfer all necessary personnel and equipment to Harrison, N. J., and in the future will build its lines of machinery at the Worthington plants. Present shop facilities of Worthington, with the additional provisions being made for the fabrication of Carbondale's refrigeration condensers, piping systems, chilling machines, and filter presses, will further extend the organization's ability to serve the refrigeration field.

Power Show, Dec. 3-8

NEW YORK—This year's Power Show —the 11th—at Grand Central Palace, December 3-8, is expected to draw an attendance upwards of 40,000. As usual, the Show occurs at the same time as the annual meeting of the A.S.M.E., and those attending the A.S.M.E. meeting will make it a point to see the Show. While no special program features have been announced, the general theme of the Show is "cutting power service costs." Heating, ventilating, and air conditioning equipment manufacturers are taking a prominent space in the exhibit. Included among the exhibitors are: The American Brass Company, Armstrong Machine Works, E. B. Badger & Sons Company, Bailey Meter Company, Buffalo Forge Company, The Philip Carey Company, Crane Company, Croll Reynolds Engineering Company, Cutler-Hammer Inc., Eagle-Picher Lead Company, Grinnell Company, Inc., Hays Corporation, E. F. Houghton & Company, Iron Fireman Manufacturing Company, Jenkins Brothers, Johns-Manville Corporation, Keasbey & Mattison Company, King & Shepherd, The Mercoid Corporation, Minneapolis-Honeywell Regulator Company, Mason-Neilan Regulator Company, National Tube Company, The Wm. Powell Company, Sarco Company, Inc., Taylor Instrument Companies, C. J. Tagliabue Mfg. Company, Walworth Company, Yarnall-Waring Company, Youngstown Sheet & Tube Company, Ilg Electric Ventilating Company, and The Ric-Wil Company.

HEATING AND VENTILATING will occupy Booths Nos. 310-311 and readers are invited to make use of this space while in attendance at the Show.

Two Companies After Chicago District Steam Franchise

CHICAGO — Public hearings on the question of franchises for the Illinois Tunnel Company and the Illinois Maintenance Company to supply steam for heating downtown buildings was held by the public utilities committee of the city council early in October. No decision has as yet been reached.

The committee now has two matters before it. The first is an ordinance prepared by attorneys for the Illinois Maintenance Company calling for a 50-year franchise for the company to supply steam heat to buildings over an area of 24 blocks in the loop. The other matter is a resolution introduced by Alderman John A. Massen for investigation of the activities of the Illinois Tunnel Company in using its tunnel for steam pipes to supply steam to loop buildings.

Both companies are now before the Illinois commerce commission requesting certificates of convenience and necessity to authorize them to supply steam to the downtown district of Chicago.

The Illinois Maintenance Company operates a district steam system and sells steam to a block or section of a block from a boiler within that block. In the past, when the company wished to cross a street, permission was obtained separately when each extension was needed. Since the Chicago Tunnel Company announced its intention of laying steam mains in its tunnels, the Maintenance Company applied for a franchise.

Some opposition to the Chicago Tunnel Company is reported by building engineers who fear they or their subordinates will lose jobs, coal dealers, who are now selling fuel to various buildings in the loop, and by the teamsters' union.

Confusion in Automatic Products Companies' Names

NEW YORK—Recent newspaper announcements regarding activities of some of the Vincent Bendix interests have resulted in confusion due to the fact that there is a similarity of names between the Automatic Products Corporation—one of the Bendix companies—and Automatic Products Company of Milwaukee. Automatic Products Company of Milwaukee is not connected in any way with Automatic Products Corporation. What made the recent news announcements especially confusing was that Automatic Products Corporation was mentioned in the same articles which stated that the Bendix concern will enter the air conditioning field. As our readers know, Automatic Products Company has long manufactured controls which are widely used in heating and air conditioning products.

$132 Million for Public Buildings

WASHINGTON — Public buildings for 812 different communities, involving expenditure of $132 million or an amount equivalent to the construction of 20,000 homes at a cost of $6,500 each, are expected to be 90% under contract during this winter.

These structures are to be built under the emergency construction program for public buildings under the supervision of the Treasury and Post Office Departments.

Since June, 78 projects, totaling $8.8 million in cost, have been placed under contract. During the same period specifications have been completed for 134 projects.

Plans are nearing completion for 301 projects and preliminary work has been started on 172 additional projects. A total of 137 projects, involving expenditures of $31.5 million are now under contract.

Congress appropriated $65 million for the program June 19. This appropriation was in addition to $67 million for public buildings already authorized under previous legislation.

Chicago Group Elects Officers

CHICAGO—A talk on counterfeiting by P. G. Drautzburg of the Secret Service featured the annual meeting and dinner of the Illinois Chapter of the A.S.H.V.E., October 8.

Officers elected for the forthcoming season are R. E. Hattis, president; J. H. Milliken, vice president; Lester Ries, secretary, and J. J. Hayes, treasurer. The board of governors consists of G. H. Blanding, J. J. Haines, and S. I. Rottmayer.

Guests at the meeting included Nikolai Alfsen of Oslo, Norway, and Axel Rosell of Stockholm, Sweden, who are making a two months' tour of the United States.

Boston Has 50,000 Burners, Detroit 16,000

BOSTON—A statement was recently given out by President Don Edwards of the Boston Oil Burner Associates that nearly 50,000 domestic power oil burners are in use within a 15-mile radius of Boston.

DETROIT—The oil burner and fuel oil interests operating in this area are concerned over the drop in domestic oil burners in use this season as compared with last. Distributors and fuel oil distributors agree that there are approximately 16,000 home burners now in operation in greater Detroit, about 2,000, or 11%, less than last season. These figures were gathered at the outset of the heating season.

Two reasons are given for the drop; first, the severe income decline of professional men, and second, the increase in the cost of fuel oil.

Housing Act and English Heating Feature N. Y. Meeting

NEW YORK—Addresses on the Federal Housing Administration, English practice in heating and ventilating, and one on the society's activities, were the three features of the first meeting of the 1933-34 season of the New York chapter, A.S.H.V.E., October 15. Julian N. Gerard, regional director for the State of New York of the Better Housing Division, FHA, was the speaker who discussed the Government's modernizing program, while national president C. V. Haynes told the members of their society's activities.

Joseph N. Russell, managing director of Rossner & Russell, Ltd., England, who is touring the United States studying American practice, briefly reviewed some of the outstanding differences between heating engineers in that country and in this. Mr. Russell pointed out that whereas in this country we design for temperature differences of 70°, in his country the maximum temperature difference is 35°. The smaller maximum load enables them to use two and three-column radiators, as compared with our five and six column.

Engineers in England have one severe obstacle which is a building act passed many years ago and which requires that hot water pipes must be 3 in. or more from wood surfaces, steam pipes 6 in. or more, and warm-air pipes 9 in. or more, regardless of the amount of the insulation on the pipes.

One manufacturer of heating equipment received 2,749 applications for loans on FHA provisions in 30 days, according to Mr. Gerard, in his talk on the Federal Housing Administration. The same manufacturer, Mr. Gerard said, reports a 50% gain in the number of loans each week when compared with the previous week.

The speaker stressed the fact that the modernizing program is only part of the Administration's program and that Title II of the Act, which will make available mortgage money for new homes, will probably go into effect about November 1. This is expected to start activity in rebuilding the country, necessary because we are said now to have a shortage of about 1½ million homes.

President Haynes reviewed the history of the New York chapter, and suggested that the chapter should be proud of its honor roll of past presidents of the national society who were members of the local chapter.

Ninety members attended the meeting, 54 of whom were present at the dinner which preceded the meeting.

Two A.C. Firms Formed in New Haven

NEW HAVEN—Comfortaire Corp., 781 Whalley Avenue, has been formed here to deal in and install air conditioning equipment. John C. Raisley, formerly connected with the Cool-Rite Products Company, maker of product coolers, is president and treasurer of the new concern, which has authorized capital of $40,000, with $10,200 paid in. Grace E. Raisley is vice-president, and J. Alfred Kroner, secretary. Carl H. Hamming is listed as a large stockholder.

Refrigeration Service Corporation has been formed here to take over the distribution of Frigidaire refrigerating and air conditioning equipment in the New Haven territory. The new corporation, which has opened showrooms and a warehouse at 40 Crown Street, has taken over the business and personnel of the New Haven branch, Frigidaire Sales Corporation of New England, located for several years at 250 Orange Street. Howard M. Canterbury, who has had many years of experience in the mechanical refrigeration field, is president of the corporation, and Arnold Thalberg is secretary-treasurer.

Spraragen Heads Own Organization

NEW YORK—William Spraragen, who for the past 15 years occupied the position of Secretary of the Division of Engineering and Industrial Research of the National Research Council, has become president of the newly-organized Spraragen Engineering Corporation. This firm will specialize in servicing companies with up-to-date expert welding engineering information. Mr. Spraragen continues as secretary of the American Bureau of Welding.

Class in A. C. Started in Northwest

PORTLAND, ORE.—A class in air conditioning has been added to the curriculum of the Oregon Institute of Technology here under the direction of Harry S. Bastian, consulting engineer and professor of mechanical engineering. This new class, made available to a large group of earnest students, meets in the evenings, under the direction of the Institute at the Y. M. C. A.

Mr. Bastian, a graduate of Bucknell University, has been most active in engineering circles of the Oregon metropolis, and has served as president of the Portland Chapter of the A.S.M.E.

Toronto A.S.H.V.E. Opens Season

TORONTO, ONT.—Two addresses of a decidedly instructive and interesting type were given at the October meeting of the A.S.H.V.E, held October 9. Lloyd Maddux, Hamilton Gas Co., Ltd., Hamilton, Ont., addressed the gathering on "The Romance of Gas." The first gas plant in Canada was in Hamilton, in 1850.

The second address was delivered by D. O. Price, General Steel Wares Ltd., Toronto, who dealt with the developments in the air conditioning field. In concluding his address, which gave much information regarding the fine research work being done by the A S.H.V.E. working in connection with the University of Illinois, he claimed that the air conditioning industry is still in its infancy and bids fair to become one of the most progressive industries in the future.

Twenty-nine members were present for the dinner. W. Blackhall, president, acted as chairman of the meeting.

Birmingham Has 200 Domestic Stokers

BIRMINGHAM—Stokers were a feature at the recent housing exhibit here in cooperation with the program sponsored by the FHA. Four local concerns actively engaged in a sales campaign for this type of automatic heat were on hand with exhibits from which they obtained numerous prospects.

Exhibitors represented were Clark & Jones, the George F. Wheelock Company, Sears, Roebuck & Company, and the Arnold Supply Company, representing as many makes of stokers. Other heating concerns which are merchandising coal stokers but did not have exhibits are the Modern Home Appliance Company and the Pate Company.

No oil burners or gas heaters were represented at the show. The local gas company continues, however, to merchandise conversion burners.

The stoker people did not launch a campaign for the domestic business in Birmingham until about two years ago and then only one concern was active for several months. Last season a number of others got into the business and now the stoker is becoming popular in Birmingham. Estimates are that more than 200 coal stokers have been installed within the past year.

One argument used in the sale of coal stokers is that Birmingham is the center of a great coal mining industry, employing more than 50,000 persons and that residents owe it to their city to use coal instead of gas or oil exported from other parts of the country.

All-Electric City Under Construction

SPOKANE—The world's first all-electric city, heated by electricity and equipped with electric ranges and refrigerators, is being built high on the east bank of the Columbia River at the Grand Coulee dam site, 92 miles west of here. This is Mason City, the town being built by the contractors for the first unit of the Coulee dam, for their employes and families.

A contract has been let here for 360 houses and 1500 electric heating units. It is thought that about 2800 heaters will be needed in all.

To get the contract for the houses the White Pine Sash Company built at its Spokane plant sample houses complete in every detail and heated with electricity.

Mason City, which will be the home for some years to come of more than 2000 men and their families, perhaps some 5000 to 10,000 people, will be a city without a chimney or smokestack although the temperature at Grand Coulee has reached 29° below zero.

WITH THE MANUFACTURERS . . .

ALFOL INSULATION CO., Chrysler Building, New York, has appointed Acme Heating & Power Equipment Corp., Springfield, Mass., as its distributor in western Massachusetts and southern Vermont. Acme is also acting as factory representative for Vent-Rite automatic air valves made by the Anderson Manufacturing Company.

W. M. CHACE VALVE CO., Detroit, has promoted Stanley R. Hood to the position of chief engineer in charge of all

Stanley R. Hood

engineering research and development in the thermostatic bimetal division of the company.

AIRTEMP INCORPORATED is the new name of Temperature Corporation, distributor of Airtemp conditioners, manufactured by Chrysler Motors. Airtemp has appointed Control Corporation of America to handle sales of the company's air conditioning equipment to theaters in the United States. Control Corporation is headed by F. B. Warren, formerly associated with Electrical Research Products, Inc., as a sales executive. Andre Merle, for three years with Clyde R. Place, consulting engineer, now heads the engineering department of Control Corporation. William E. Harkness, formerly with American Telephone and Telegraph Company, will be traffic and contracting consultant. Offices of Control Corporation of America are at 250 West 57th St., New York.

Airtemp has named David French as its eastern sales manager with headquarters at New York. Mr. French was from 1919-29 in General Motors' export department.

CENTURY ENGINEERING CO., Cedar Rapids, Iowa, has appointed George L. Clift Co., Boston, eastern Massachusetts distributor of its oil burner, with retail dealership franchise also for metropolitan Boston.

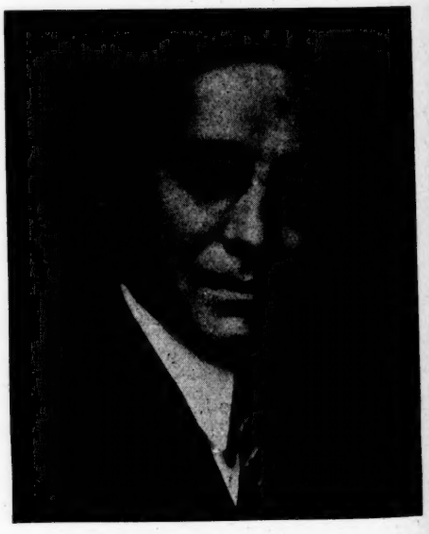
SPENCER THERMOSTAT CO., 34 Forest St., Attleboro, Mass., announces that V. G. Vaughan has joined its organization as manager, in which position he will be in charge of all operations, including development of new products. Mr. Vaughan became associated with Westinghouse following his graduation from Georgia Tech and until June 1 of this year was manager of the Appliance Engineering Division of that company.

ILG ELECTRIC VENTILATING CO., 2850 North Crawford Ave., Chicago, announce the opening of a new sales office at 122 Jay St., Schenectady, in charge of R. R. Cooper.

COMBUSTION ENGINEERING CO., INC., 200 Madison Ave., New York, announces that Roger W. Andrews has been made western manager of the newly-formed Western Division.

Mr. Andrews' connection with the steam power field dates back to 1910 when he joined the Northern Equipment Company. In 1914 he formed the R. W. Andrews Company of Chicago, handling power plant equipment, and a year later joined with Grant D. Bradshaw to form the Andrews-Bradshaw Company with headquarters in Pittsburgh.

In the early twenties the Andrews-Bradshaw Company developed certain specialized boiler room equipment and took over the engineering and sales for the entire country. In 1928 the Andrews-Bradshaw Company merged with the Blaw-Knox Company of Pittsburgh as a division of the latter and Mr. Andrews became manager of that division. He was later made assistant to the President. He resigned September 1 of this year to join Combustion Engineering Company.



Roger W. Andrews

Boston A.C. Jobs Up 400%

BOSTON—The volume of Boston sales of air conditioning for the first eight months of this year was five times greater than that of the entire year of 1933. In the Boston territory a total of 2,675-hp. capacity has been sold chiefly to business firms, up to September 1, against a total of 516 hp. connected in 1933.

These figures, made public by Julius Daniels, president of the Air Conditioning Bureau, and compiled by Daniel Ricker, secretary, indicate some 40 sales to business houses and for commercial use. The largest single installation is that of Wm. Filene's Sons Company, which is now under way and provides for the conditioning of that entire department store on Washington Street. A Carrier 2000-hp. system is being installed.

Pacific Coast Utilities Study A. C.

SAN FRANCISCO—An air conditioning committee recently made a report to the Pacific Coast Gas Association covering the proper methods to be followed in promoting the air conditioning business, particularly as it refers to the activity of the gas utilities. The following quotation is from the report:

"Our thoughts on this matter can be summarized as follows:

1. That the utilities institute an educational program for their salesmen on the fundamentals of air conditioning.

2. That the educational program consist principally of acquainting the salesmen with the available equipment on the market so that they can distinguish between properly and improperly designed devices and the correct and incorrect application according to their climatic needs.

3. That the promotion of air conditioning be a cooperative campaign—the utilities selling the idea to the public and the dealer selling and installing the equipment. The utilities for the present should not attempt to merchandise air conditioning equipment as the multitude of appliances offered for sale under that name cover too wide a field of manufacture and design.

4. The utilities to insure the success of such a campaign by compensating their salesmen on a load building basis rather than on a merchandising basis.

5. That the utilities build their advertising and publicity of house-heating around the idea of air conditioning, stressing the fact that house-heating is only one factor of air conditioning.

6. Forming a tie-in of dealer advertising along with utility advertising.

7. That the utilities endeavor to promote air conditioning for the purpose of combating the inroads already made by the United Electrical Industry in selling the idea of 'Comfort Cooling' as being air conditioning. This can best be accomplished by encouraging the already established heating contractors to merchandise complete air conditioning.

"It is only logical that the buying public should come to the utility office for unbiased and accurate information in connection with the installation of air conditioning equipment in the same manner in which it has been encouraged in the past to rely upon the utility for reliable information in connection with proper heating. The fuel which first wins from the public the conviction that it is 'the fuel for air conditioning' will have a priceless asset of first rights. The others will be doomed to the bitterness of a prolonged stern chase for equal recognition. If gas loses in this first and determinant period, its later battle for a sizable air conditioning load will be slow and fearfully expensive. Therefore, the Committee recommends that the gas industry actively promote air conditioning."

Cooling Towers Subject of West Coast Meeting

SAN FRANCISCO—At the regular October meeting of the Air Conditioning Society of San Francisco, Morton B. Smith, Hammond Lumber Company, gave a talk on the "Construction and Operation of Cooling Towers in Connection with Air Conditioning Equipment." The natural temperature of water in most sections of California ranges from 60° to 70°, and can be used in connection with cooling towers of air conditioning plants for cooling water.

The Air Conditioning Society of San Francisco has as its motto: "To warm in winter, cool in summer and to purify and ventilate at all times." The object of the Society is to encourage and promote the conditioning of air, either for comfort and health, or to improve the processes of commerce and industry. Its aims are to further the education of its members in the science of air conditioning; to provide a forum for the interchange of ideas on this subject; to promote cooperation and good-will of the membership; to disseminate to engineers and architects authentic information which may be of assistance to them in planning projects which will reflect credit on the science of air conditioning; to foster the education of the public generally as to the uses and advantages of air conditioning.

Informal luncheon meetings are held at least once each month to provide for interchange of ideas and friendly intercourse among those called upon to solve related problems, whether manufacturers or their representatives, designers of utilization, or others vitally interested.

Membership consists of active and associate classifications, active members being selected from those designing or otherwise engaged in the manufacture, distribution, or application of air conditioning apparatus; associate members being elected from others intrested in air conditioning. Applicants must show sufficient education or experience to indicate that the individual can contribute to the combined knowledge of the Society.

The Society does not take sides in partisan issues between conflicting interests, but strives to instill confidence in such processes as become established, and to encourage development work.

Officers of the society are G. W. Nunn, president; H. T. Holbrook, vice-president, and J. W. Wrenn, secretary.

The executive committee consists of the officers of the Society, and two members, one of whom shall be the past president, and shall arrange programs for meetings and handle the routine business of the Society according to the approved policy of the membership.

Orr and Converse Move

NEW HAVEN, CONN.—Douglas Orr, architect, announces the removal of his office from 956 Chapel Street to 96 Grove Street. T. J. Converse, mechanical engineer associated with Mr. Orr, will also be located at 96 Grove.

FHA Explained to Boston Group

BOSTON—The first meeting of the 1934-35 season of the Boston Chapter A.S.H.V.E. was held October 8. John F. Malley, state director of the Federal Housing Administration, explained the purposes and details of the National Housing Act.

500 Install Gas Heating in Denver

DENVER—As their house-to-house canvass on domestic heating neared the end of the second month, with the 57,000 homes in the district about half covered, the Public Service Company of Colorado announced that more than 500 new customers had been obtained for natural gas.

Nash Makes Pumps for Car A. C.

NORFOLK, CONN.—The Nash Engineering Company has received an order from the Safety Car Heating & Lighting Company for 600 small pumps to be used in the installation of air conditioning equipment in 300 rail'road cars, according to Harold L. Nash, secretary.

A.S.M.E. to Have Sessions on Heating and Ventilating

NEW YORK—A session on fans and another on domestic heating are scheduled for the annual meeting of the A.S.M.E., in New York, December 3-7.

The fan session will be under the auspices of the Power Test Codes Sub-Committee and presided over by W. H. Carrier. Five papers will be presented as follows:

"Air Flow in Fan Discharge Ducts," Lionel S. Marks, professor of mechanical engineering, Harvard University; "Pulsating Air Flow," Neil P. Bailey, Iowa State College; "Progress Report on Fan Research at Lehigh University," W. E. Somers, Lehigh University; "Status of Test Code for Fans," M. C. Stuart, Lehigh University; "The Intake Orifice and a Proposed Method for Testing Exhaust Fans," N. C. Ebaugh and R. Whitfield, Georgia School of Technology.

The domestic heating session is under the auspices of the Fuel Division. R. A. Sherman of Battelle Memorial Institute will preside. The three papers are:

"Experience with Application of Central Station Practice to Domestic Heating," M. K. Drewry, assistant chief engineer of power plants, Milwaukee Electric Railway & Light Company; "The Use of Oil in Domestic Heating," L. E. Seeley, professor of mechanical engineering, Yale University; "The Use of Gas in Domestic Heating," R. B. Leckie, professor of gas engineering, Purdue University.

Both sessions will be held Tuesday, December 4, the fan session in the morning, the heating session in the afternoon.

Gas Heater Makers Elect Officers

CHICAGO—At the annual meetings of the five gas appliance institutes here new officers were elected. Included were those for the Gas Boiler, Furnace and Conversion Burner Institute, officers for which are: administrative committee—F. H. Adams, E. P. Bailey, Jr., L. Cinq-Mars, E. A. Jones, and W. S. Gordon, Jr.; governing committee—Messrs. Adams, Bailey, Gordon, and H. L. Whitelaw.

C. W. Berghorn and A. W. Torbet were elected secretary-treasurer and assistant secretary-treasurer, respectively.

Zink and Land Prepare Welding Paper

NEW YORK—At the 14th meeting of the American Welding Society held at the Hotel New Yorker, October 1-5, John H. Zink presented a paper prepared by himself and Dr. S. Lewis Land on "Qualifying Operators on Pipe Welding." This paper was part of a symposium on the general subject of qualifying operators of welding equipment and expenses incurred therein, and occupied the Friday afternoon session of the meeting.

Detroit Adds 53 A.C. Jobs in 3 Months

DETROIT—According to S. S. Sanford, sales engineer of the Detroit Edison Company, Detroit has a total of 174 air conditioning installations to date, with a total of 11,454 hp. in motor equipment, excluding the power used in connection with the pumps and fans. The data below cover the quarter ending September 26, 1934, and show the number and type of installations with their corresponding horsepower.

Type of Installation	Number of Installations	Hp.
Offices	10	116
Restaurants	6	94
Night clubs	2	25
Hotels	1	20
Residences	10	15.5
Drug stores	1	30
5 & 10 cent stores	1	120
Candy stores	2	42.5
Department stores	2	9.5
Jewelry stores	2	22.5
Opticians	2	2
Beauty parlors	1	5
Clothing stores	7	71
Electrical company offices	1	7.5
Library	1	4
Theaters	1	45
Drug manufacturing plants	1	6
Print shops	1	20
Undertaking parlors	1	15
TOTAL	53	670.5

"In addition to our motor-driven compression installations, we have a record of nine installations using well water for cooling, this year, and two installations that were made this year. It is very likely that we shall see many more of this type of installation because of its lower initial cost of installation and its lower operation cost. In this installation the motor required for pumping the water is about one sixth the size of that needed for a refrigeration compression engine of the same cooling capacity," said Mr. Sanborn.

"We have a record to date of 23 fan installations: three in churches, one in an apartment house, and one in our Mount Clemens Detroit Edison Company office."

Installations being completed in the Detroit area at the present time are: a primary installation at the Ebbling Creamery plant, 3925 Tillman Avenue; an installation replacing old equipment at the Ebbling Creamery plant on Trumbull Avenue, and a 75-hp. compressor at the H. A. McDonald Creamery Co., 9700 Oakland Avenue.

The American Brewing Company of Michigan, 8051 Medina Street, is considering the installation of air conditioning equipment employing a 100-hp. compressor.

Central Hudson Lowers Rates

POUGHKEEPSIE — Approval has been given by the Public Service Commission of New York for lower rates for gas for heating purposes provided by the Central Hudson Gas & Electric Corporation to communities in Duchess and Orange Counties. The new gas rates effective October 1, give customers in Poughkeepsie, Newburgh, Kingston, and Beacon a scale from 75 cents per 100 cu. ft. to 5.4 cents.

Price, Indiana Wholesaler, Heads Industries Bureau

CHICAGO — Enthusiastic approval of the work of the Plumbing and Heating Industries Bureau in keeping the products of these industries prominently before the public by means of newspaper, magazine, and radio publicity was expressed at the annual meeting of the Bureau held at the Stevens Hotel, October 8. The meeting was attended by representatives of the 21 associations of manufacturers, wholesalers, and contractors who are financing the publicity work of the Bureau this year.

The directors elected the following officers: W. E. Price, president; John J. Calnan, vice-president; Harry F. Beglen, treasurer; Norman J. Radder, secretary.

Mr. Price is president of the Knapp Supply Co., Muncie, Ind., and president of the Central Supply Association. For many years he has been active in the promotion of modernization campaigns in Muncie and other Indiana cities.

Boston Dealers Hold Joint Meeting

BOSTON—At a joint meeting of the Air Conditioning Bureau of Boston and the Boston Oil Burner Associates, held at the Engineers' Club October 17, addresses were given by a number of speakers on the general subject of automatic heating and air conditioning.

Jack Scott, of Buckley & Scott, spoke on conversion type oil burners; Harry Mayo discussed gas-fired boilers; Lowell Curtis, of Curtis & Brock, automatic stokers; while Don Edwards, of General Heat & Appliance Corporation, spoke on oil-burning boiler and furnace units.

A lecture bureau or service has been formed by the Air Conditioning Bureau to supply speakers on the subject of air conditioning at conventions, association gatherings, such as the Rotary and Kiwanis Clubs, women's clubs, etc. All calls for speakers on this subject to the Air Conditioning Bureau will be handled by this committee.

Canada City's District Heat Plan Dropped

VICTORIA, B. C.—The anticipated central heating plant for the center of the city will not likely become a reality for some time to come. The Victoria Central Heating Company which was granted a charter has withdrawn its application owing to the fact that it has found itself unable to accept terms laid down by a special committee of the city council.

St. Louis Firm Changes Name

ST. LOUIS — The St. Louis Heating Co., 2901 Elliot Street, manufacturer of furnaces and air conditioning units, has changed its name to the Home Comfort Furnace and Manufacturing Company. W. Wimmer is president of the company.

Refrigerating Machinery Builders Meet, Elect Benedict

CHICAGO—The Refrigerating Machinery Association held its 21st annual meeting at the Stevens Hotel October 22-23. Because of the interest in new technical developments in the field of commercial and industrial refrigerating, recent governmental policies particularly affecting durable goods industries, the codification of the Refrigerating Machinery Industry, whose code is now actively in operation, and the opening up of attractive export sales fields for refrigerating equipment, the meeting was one of the largest and most interesting in the history of the association.

W. S. Shipley, president of the association and head of the York Ice Machinery Corporation, in his opening address discussed the possibilities for export trade which he believes distinctly optimistic.

While there had been no appreciable increase in the volume of business in the refrigerating machinery industry over the past year and while, as a matter of fact, many of the companies engaged in this field had suffered substantial decreases in business, Emil Vilter, head of the Vilter Manufacturing Co., Milwaukee, in reporting for the manufacturers' committee, stated that wage rates had been substantially increased during the past year, in many cases in excess of the rates prevailing in 1929. However, Mr. Vilter pointed out, the average earned income of employes still continued below the 1929 level because of the lack of business, which was substantially curtailing operations of all the plants in the industry.

A. H. Baer, vice-president, Carbondale Machine Corporation, in reporting for the standing committee on standardization, stated in detail the satisfactory progress being made in this field. Lee Nusbaum, Pennsylvania Engineering Co., Philadelphia, reported for the business ethics committee; Stuart E. Lauer, York Ice Machinery Corporation, reported for the fair trade practice committee; L. S. Morse, York Ice Machinery Corporation, reported for the committee on safety code for mechanical refrigeration, and William B. Henderson reported for the membership committee. The reports of all these standing committees were particularly marked by statements of substantial accomplishment over the past year, and other standing committee reports indicated marked progress being made.

Mr. Shipley, in retiring from the presidency of the association, thanked the other officers and members of the association for the splendid support accorded him. J. I. Lyle, president of Carrier Corporation, presented Mr. Shipley with a barometer on behalf of the members of the association.

D. Norris Benedict, vice-president and general manager, Frick Co., Incorporated, was unanimously elected to the presidency of the association to succeed Mr. Shipley, and J. M. Fernald, general manager, Baker Ice Machine Company, was elected vice-president of the association.

The new executive committee is composed of Messrs. Benedict, Baer, Fernald, Lyle, Shipley, Vilter, and G. A. Heuser, secretary-treasurer, Henry Vogt Machine Company.

Sturtevant Gets Tunnel Contract

BOSTON—The B. F. Sturtevant Company has secured the contract for ventilating fans for the Broadway low-level vehicular tunnel project between Alameda and Contra Costa Counties in California. When completed this tunnel will be the largest subterranean vehicular tunnel in the world. The total capacity of the fans will be 2,000,000 c.f.m.

U.S. Firm Sells A.C. to Egypt

WASHINGTON—The Machinery and Agricultural Implements Div., Department of Commerce, states that Commercial Attaché C. E. Dickerson, Jr., has reported that the first air conditioning equipment sold to Egypt is now being installed. Mr. Dickerson's report follows:

An American company has just obtained the first contract ever awarded for the installation of air conditioning equipment in Egypt. Up until two or three years ago such equipment was practically unheard of in Egypt, but recently some interest has been manifested among local owners of public establishments, especially cinema theaters. The actual business, however, had never been done in this field until the present instance, although a number of interested parties had seriously been studying the advisability of installing such equipment in their establishments.

One of the principal reasons for which none of these plans had heretofore materialized is the high cost of the equipment. This feature, for example, brought about an unfavorable decision on the most promising opportunity which had been presented, namely, the installing of air conditioning equipment in the Egyptian Chamber of Deputies. It is to be recalled that late in 1932 the Egyptian government decided to install this equipment in the Chamber and that not only were specifications and conditions of tender drawn up but a credit of L.E.6,000 was opened for the purpose. (One L.E. equals $4.9824 at the present rate of exchange.) Six British, three German, two Swiss, and one American, in all, 12 manufacturers, participated in this tender, the lowest bid being L.E.6,885 and the highest L E.13,830, the latter made by the American firm mentioned. It was found impossible by the government to accept any bid because the lowest exceeded its L.E.6,000 estimate, and its economy policy led to a decision not to increase the amount. Accordingly, the tender was cancelled and has not been reissued.

The present and first air conditioning equipment in Egypt will be installed in the studio of the Société Misr pour le Theatre et le Cinema located near the Pyramids, and, as mentioned, the job has been undertaken by a prominent American firm. The local company is one of the affiliates of the Banque Misr, the only purely Egyptian banking institution and one of the pioneers in the development of local industries.

The cost of the equipment (centrifugal system) will be approximately L.E.6,000, including the expenses of the engineer to be sent from the United States to install it. This business was awarded by tender and was highly competitive, a large number of bids having been made.

Cork Houses Shipped to Alaska

SEATTLE—Two complete cork houses, 18 ft. x 30 ft., left Seattle Oct. 5 on the Lomen Commercial Company's ship, "Baldwin," for Nome, Alaska. They are 100% fireproof, soundproof, and constructed to withstand a 70-mile wind, and the roofs to support a 10-ft. fall of wet snow.

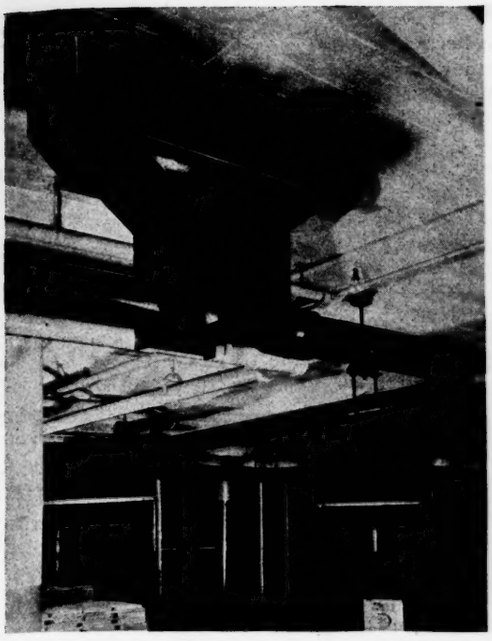
Cork used for house construction is a new idea in the West, although it has been experimented with for a few years in the East. The idea is practical, builders say. The two houses on their way to the North, can be erected within a few hours. Over a framework of steel are laid 3-ft. slabs of cork. The interior is plastered, and the exterior stuccoed.

↑ EUPATHEOSCOPE exhibited by Dr. E. E. Free at meeting of the Electrical Association of New York on air conditioning. This instrument contains an electric heater, emits heat at a known rate, thus measures comfort in a room. If heat is lost too rapidly the room is too chilly; if too little is lost, the room is too warm.

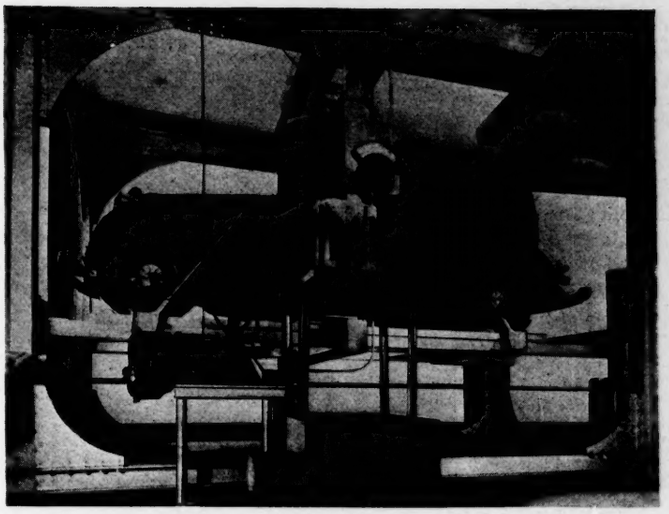
← AIR CONDITIONED KENNELS on the sun deck of the United States liner *Manhattan*. A similar cage will be used by Admiral Byrd on his return from the South Pole to keep penguins in good shape.

PICTURE PARAGRAPHS

↑ AIR CONDITIONED BABIES, the world's first, born in the Frigidaire-cooled obstetrical room of the Crawford W. Long Memorial Hospital, Atlanta. Maternity Ward Nurse Winifred Ellis holds the air conditioned (left) Allen and (right) Johnson babies.

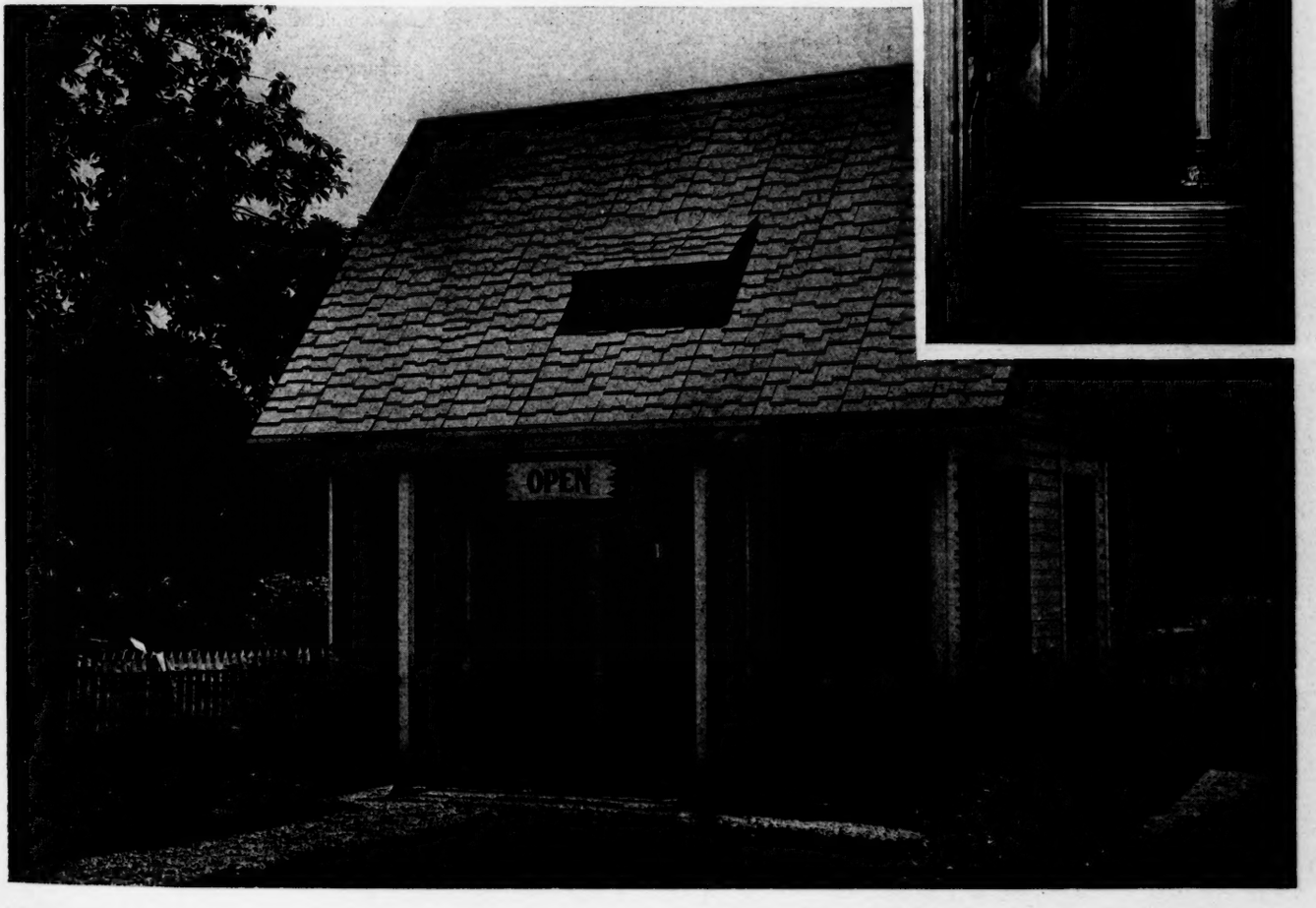


↑ EIGHT MILES OF ARC WELDED PIPING, which cost a million and a quarter dollars, supply heat for U. S. Government buildings in Washington. View shows welded anchorage built up from structural shapes for the 6-in. welded main in the Federal Warehouse. Photo by The Lincoln Electric Company.



↑ FROZEN POWER. The Willard Storage Battery exhibit at the Century of Progress. A battery frozen in a cake of ice supplies the energy to lift an automobile. A 5-hp. York ice machine is used to "hold" the ice blocks while the batteries are being charged frozen in the ice.

CONDITIONING CALIFORNIA'S CLIMATE. On Highway No. 66, near Glendora, Southern California Edison Company Ltd. has built this air conditioned cottage, which is used as a rest station by travelers. Purpose of the cottage is to feature air conditioning. A remote-located room cooler is used with the compressor condenser unit, shown to the right, located in a closet.



Fahey Favors Long-Term Amortized Mortgages

WASHINGTON—Declaring that present faults in the system for financing homes "imperil the entire credit structure of the nation," John H. Fahey, chairman of the Federal Home Loan Bank Board, contributes a detailed analysis of the Government's program for the elimination of those faults to the initial issue of the Federal Home Loan Bank Review, published October 15.

Mr. Fahey throws the spotlight on the practices which led in the five years of the depression to so many hundreds of thousands of home foreclosures with resultant disaster to all real estate values. Singled out for special condemnation are the extensive use of the costly second mortgage, the practice of short-term straight mortgages, shoestring buying by homeowners, the lack of uniform standards among home-financing institutions, high interest rates, and high service charges for home financing and excessive construction costs.

The cornerstone of the Government's program for the organization of the Nation's home-financing system and the elimination of most of these defects, according to Chairman Fahey, is the long-term amortized loan. Widespread substitution of this type of loan for the short-term straight loan would, he writes, largely eliminate the need for the costly second mortgage and for uncertain renewal of straight mortgages. Accordingly, the entire weight of the Federal agencies set up under the Federal Home Loan Bank Board and the National Housing Administration is thrown back of the long-term installment type of mortgage.

Engineer Builds A. C. Home

ST. LOUIS—Ernest A. Freund, air conditioning engineer of the United Electric Light & Power Company, is building an air conditioned residence at 212 Linden Ave., University City. The house is built on a reinforced concrete slab, is completely insulated, and has year-round air conditioning.

Gas and Oil Equipment at Conn. Exposition

WATERBURY, CONN.—Exhibits of heating equipment, both gas and oil-fired, dominated the annual Wonder Exposition held at the State Armory here October 15-20, under the joint auspices of the National Guard and the Waterbury *Republican* and *American*, newspapers.

The Connecticut Light & Power Company showed, at its exhibit, a Janitrol conversion gas burner, Bryant gas-fired boiler, and G. E. gas furnace. Charles Thatcher Company, contractor, had a booth devoted to Perfection heating and Superfex air conditioning equipment. The Domestic-Appliance Company exhibited Fluidheet oil burners, while the Timken line was shown by Clapp, Rose & Vaughn, Inc. The Southern New England Ice Company exhibited Silent Glow Oil burners.

Urges Dept. Stores to Sell A. C.

NEW YORK—Sales possibilities comparable to those in the automobile industry 25 years ago are being opened for retailers through the rapid perfecting of air conditioning units for houses, Kenneth Collins, assistant to the president of Gimbel Brothers, said in an address October 24 before a luncheon meeting of the Retail Electrical Appliance Association at the Hotel Governor Clinton.

He urged retailers to be alert to the opportunities in marketing air conditioning equipment and not repeat the mistake of 25 years ago, when, through shortsightedness, stores lost the opportunity to do billions of dollars in added volume by selling automobiles.

"We mustn't let this second opportunity slip through our fingers," Mr. Collins continued. "Air conditioning producers are already flirting with the idea of setting up distributive systems similar to those which the automobile interests were compelled to establish when retailers proved cool to the idea of handling cars."

Santa Fe Adds 80 A. C. Cars

NEW YORK—The Santa Fé Railway has ordered air conditioning equipment for 80 additional cars from the Safety Car Heating and Lighting Company. The order may be increased to equip 200 cars. Most of the 80 cars affected by the order are Pullmans.

A.C. Declared Boon to Restaurants

CHICAGO—Air conditioning will increase business by stimulating appetites, and at the same time will create a pleasant atmosphere by decreasing the irritability of customers and employes alike, according to experts who spoke to visitors at the National Restaurant Association's 16th annual meeting and exposition. The conclave opened Oct. 1 in the American Furniture Mart, 666 Lake Shore Drive.

What this great advance in human comfort means to the restaurant industry was explained by F. C. Lyons, Frigidaire Sales Corporation, and E. B. McClelland, General Electric.

Zink on Acetylene Meeting Program

PITTSBURGH—John Zink, vice-president of the Heating, Piping and Air Conditioning Contractors National Association, will speak on "Pipe Welding" at the 35th annual convention of the International Acetylene Association here November 14-16. Headquarters will be at the William Penn Hotel.

Mr. Zink's talk will be at the Thursday afternoon session covering Pipe Welding and Testing, under the chairmanship of Dr. F. N. Speller, director of the Department of Metallurgy and Research, National Tube Company.

A. C. Division of G. E. Transferred

SCHENECTADY — Activity bearing on the marketing of G.E. air conditioning systems has been transferred to the commercial engineering division of the air conditioning department here.

Since October 1, Elliott D. Harrington, engineer of the commercial engineering division, has been responsible for the sale of air conditioning systems, in addition to the duties he has performed in the past. The transfer was effected due to the close relationship between engineering and sales necessary because of the amount of fabrication in the field.

Steam Heat for Planes

WASHINGTON—A steam heating plant, thermostatically controlled to maintain 70° in the passenger cabins of transcontinental air liners, is the latest achievement of aeronautical engineers, according to Transcontinental and Western Airways, Inc.

The steam heater is a small boiler in which water is heated by the engine exhaust. This method eliminates any possibility of noxious exhaust gases entering the cabin. The ventilating system of the plane changes the air in the cabin every 2 min.

Socony-Vacuum After Fuel Oil Business

NEW YORK—Prospects for a cold, stormy winter, predicted by many weather prophets, point towards a further upturn in the sale of fuel oils, according to the oil industry. Last winter sales totaled a billion gallons.

Socony-Vacuum Oil Company, Inc., one of the world's largest marketers of fuel oils, is embarking on its first extensive advertising program featuring this product. A comprehensive campaign will be carried on in 168 newspapers in New York and New England. The central theme, based on the results of a market survey, stresses prompt deliveries in all kinds of weather, made possible with 3000 fuel oil trucks.

Boiler and Radiator Makers Organize Against Illegitimate F.D.C.'s.

GENEVA, N. Y.—According to F. W. Herendeen, secretary of the Institute of Boiler and Radiator Manufacturers, a clearing house has been set up by cast-iron boiler and radiator manufacturers to check on future delivery contracts in order to enable manufacturers to do away with such of these contracts as are illegitimate.

Boiler and radiator manufacturers recently met in New York and approved a budget for the clearing house which is now functioning through neutral agencies who are checking their reinstatements of f.d.c.'s. completely throughout the country. These agencies report to the secretary of the Institute who in turn reports to the manufacturers and gives them an itemized report on each contract.

The future delivery contract is one made by the contractor or wholesaler with the manufacturer calling for a specific boiler for a specific job, usually prior to a price increase. This protects the buyer from any price increase as he will be purchasing at the price before the advance. In a large number of cases, purchasers so ordering have no specific job in mind but are gambling on receiving a job in the near future at which time they merely change the size of the boiler to suit the particular job. Investigation has shown that fictitious names and addresses of building owners are given and that this practice results in unfair competition to the wholesaler and contractor who does not engage in such methods.

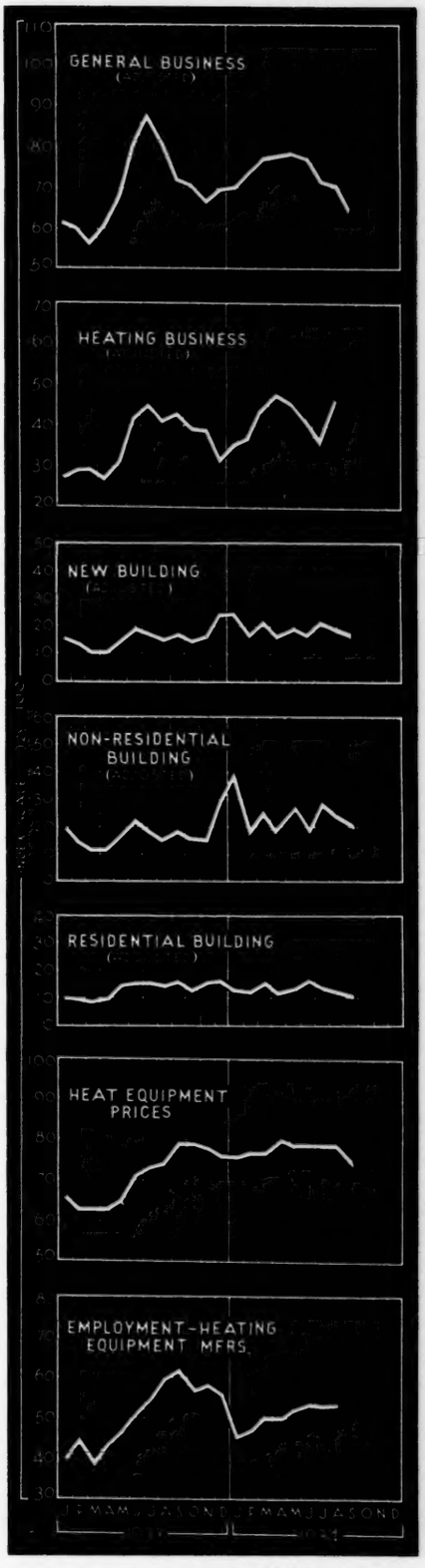
In addition, every manufacturer now requires each buyer to accompany his f.d.c. with a $2 fee which is to be used for checking purposes by the neutral agency.

A.S.M.E. Holds Air Conditioning Meeting

NEW YORK—The first air conditioning meeting of the Metropolitan Section of the A.S.M.E. was held October 22 in the Engineering Societies Building. About 150 members and their guests heard A. M. Norris describe his Psychograph, a chart for the graphical solution of air conditioning problems. Each member of the audience was given a copy of the graph and a number of graphical solutions so that the explanation was made easier to follow.

W. H. Carrier complimented Mr. Norris on his ingenuity in evolving this new type chart. He then compared the graphical solutions of problems by the Norris chart with those by the Carrier chart. A number of the other members also took part in the discussion.

Business Trends


GENERAL BUSINESS
HEATING BUSINESS
NEW BUILDING
NON-RESIDENTIAL BUILDING
RESIDENTIAL BUILDING
HEAT EQUIPMENT PRICES
EMPLOYMENT-HEATING EQUIPMENT MFRS.
J F M A M J J A S O N D J F M A M J J A S O N D

Above charts marked "adjusted" are those in which corrections have been made for seasonal variation. The second chart is that of HEATING AND VENTILATING'S Index of Heating Business Activity. New Building figures are from F. W. Dodge Corp. The general business index is based on the "New York Times" weekly index. Indexes of employment and prices are based on data of the Bureau of Labor Statistics, U. S. Dept. of Labor.

Standard Lime & Stone Holds Convention

BALTIMORE—The second annual sales convention of the Insulation Division, The Standard Lime and Stone Company, was held here October 5-6. About 100 dealers attended.

Speakers on the program included J. H. Baker, president, F. C. Russell, sales manager, and J. H. Whaley, Jr., assistant sales manager, The Standard Lime and Stone Company; C. W. Presdee, HEATING AND VENTILATING; H. A. Beers, Cleveland; Walter P. Sinclair, mechanical engineer; J. R. Waller, president, International Bank and special representative of the Federal Housing Administration, and Joseph M. Cerreta, Suburban Insulation Co., Roselle Park, N. J.

Delco Phila. Distributor Leads

PHILADELPHIA—The Elliott-Lewis Company, distributor of Delco appliances, has been notified by Delco Appliance Corporation that it is leading all other distributors in the entire United States in sales. The Elliott-Lewis Company anticipates a steady increase in its sales during the next few months.

Conn. Utility Cuts Gas Rate

WALLINGFORD, CONN.—A combination service rate has been announced by the Wallingford Gas Light Company. The new rate, which became effective November 1, offers a substantial reduction and is available to all customers who use gas for heating and/or cooling.

The new rate schedule is as follows: For the first 200 cu. ft. (or less) per month, $1 net; next 1,800, 11½ cents per 100 cu. ft.; next 1,000, 10 cents per 100; next 67,000, six cents per 100, and all over 70,000, five cents per 100. The minimum bill is $1 per month, and at least $25 worth of gas must be used during the heating season, October to May, inclusive.

Philippine Trains Have A. C.

SAN FRANCISCO—According to James King Steel, Tourist commissioner of the Philippine Islands and a recent guest in San Francisco, the Ilocos Express, running between Manila and Baguio, now has air conditioned compartments and dining cars. Hotels and office buildings on the Islands also are installing air conditioning apparatus.

Many of the business men of Manila have their offices equipped with air conditioned service, so that they can work in temperate zone conditions. The Manila Hotel is installing this service in many of its suites and superior rooms.

Contractors' Code Under Way in Michigan

DETROIT—The local NRA administrative agency for the heating, piping, and air conditioning industry in Wayne, Monroe, Oakland, Macomb, and Washtenaw counties (the area around Detroit), which was organized in September, was authorized on October 22 to begin operations at once, according to Secretary George S. Clarke.

The authorization from Washington permits the agency to proceed with the establishment of a bid depository. The Builders and Traders Exchange has been selected to act in this capacity. Notices went out a few days later to approximately 1,200 firms involved in the heating, piping, and air conditioning industry in these five counties pointing out the provisions of the code, stressing the clauses requiring registration of contracts and stipulating the fees to be paid.

R. L. Spitzley, of the R. L. Spitzley Heating Co., Detroit, past president of the Heating, Piping and Air Conditioning Contractors Detroit Association, has been appointed chairman of the administrative agency for Michigan.

Gas Increase Asked for Alabama City

BIRMINGHAM—The Birmingham Gas Company has filed a petition with the Public Service Commission seeking to raise rates 26%. The City of Birmingham filed a counter petition seeking a 25% reduction in the company's rates.

The gas company in its petition claimed that it cannot carry its present bonded indebtedness unless rates are increased the amount requested. The city commission contended that now is the time to reduce rates instead of increasing them.

The public service commission has set the case for a hearing November 7, but the city has requested a postponement until December 7 so that engineers may complete an analysis of rates as now charged.

BIRMINGHAM—Coal prices in Birmingham have increased about 60%, according to dealers. Little protest over the increase has been heard as prices were unusually low last year. Purchases have been unusually heavy on predictions of a hard winter.

Chicago Building to be Conditioned

CHICAGO—The Monroe-Dearborn Building, now being completed, will be entirely air conditioned An Auditorium System is being installed by Narowetz Heating & Ventilating Company, using apparatus supplied by the American Blower Company.

S. R. Lewis is the engineer.

Daniel Bradford Badger

WINCHESTER, MASS.—Daniel Bradford Badger, chairman of the board of E. B. Badger & Sons Co., Boston, died at his home here, October 3.

Mr. Badger was 84 years old and was associated with the company bearing his name since he was 16 years old. Starting in as an apprentice with coppersmiths Hicks & Badger (as the firm was then called), he worked his way up through various positions until 1879 when he became a partner and the name of the company was changed to E. B. Badger & Son. In 1900, when the business was incorporated under the name E. B. Badger & Sons Company, Mr. Badger became vice-president. Later he became president, and less than a year ago was made chairman of the board.

In spite of his advanced years, Mr. Badger was active in the business and until only a few weeks ago was at the office almost every day.

Besides his business interests, Mr. Badger was director of the Winchester Savings Bank and president of the Home for Aged Couples in Roxbury, Mass.; president of the Massachusetts Charitable Mechanics Association. For a considerable period he served as president of the Master Builders Association of Boston. He was also a member of the Ancient and Honorable Artillery of Boston and of the Old School Boys.

Mr. Badger is survived by his widow, three sons, four brothers, and a sister.

What is the Heating Industry

(Concluded from page 42)

pany; W. E. Barnes, Barnes & Jones; and C. A. Dunham, C. A. Dunham Company.

Rock and Slag Wool Manufacturing Industry has applied for approval of its budget of $7,027.65 for the period from August 1, 1934 to December 1, 1934. Assessments are on the basis of ½ of 1% of sales of the members of the industry which totaled $1,686,634.30 the first six months of 1934.

Oil Burner Industry—During October, NRA announced that manufacturers of distillate burners have been exempted from the oil burner code and will be covered by a proposed supplementary code for the liquid fuel appliance manufacturing industry. This code is now under consideration.

The Distillate Burner Manufacturers Association, Inc., and individual members of the industry asked for the change. The Code Authority for the oil burner industry approved.

The marketing and manufacturing of distillate burners differ in many respects from that of oil burners, the widest difference being that distillate burners are marketed through department stores and other retail channels, while oil burners are marketed principally through specialty sales organization.

Nonferrous and Steel Convector Manufacturing Industry—An amendment approved September 27 permits the Code Authority to incur reasonable obligations necessary to support the administration of the Code and enables it to submit an itemized budget and equitable basis of assessment upon members of the industry to the Administrator for his approval. Such assessments are made mandatory by this amendment.

Unit Heater and/or Unit Ventilator Manufacturing Industry—Amendment approved September 22, 1934, covers identical points as those mentioned in above code.

Jobbers—The code for the wholesale heating and plumbing products and/or distributing pipe, fittings, and valves industry has been stayed until October 24. They stay was granted to give members of the industry time to present their objections to the clause exempting the wholesale hardware industry from the code.

Warm-Air Furnace Manufacturing—The Code Authority budget and basis of assessment was approved late in September.

COMING EVENTS

NOVEMBER 14-16, 1934. *Meeting of the International Acetylene Association, William Penn Hotel, Pittsburgh.*

DECEMBER 3-7, 1934. *Fifty-fifth Annual Meeting of the American Society of Mechanical Engineers, New York, N. Y.*

DECEMBER 3-8, 1934. *Eleventh National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.*

DECEMBER 5-7, 1934. *Thirtieth Annual Meeting of the American Society of Refrigerating Engineers, Hotel New Yorker, New York.*

JANUARY 28-30, 1935. *Forty-First Annual Meeting of American Society of Heating and Ventilating Engineers, Hotel Statler, Buffalo, N. Y.*

JUNE, 1935. *Annual Convention of the National District Heating Association, Philadelphia, Pa.*

HOT WATER SUPPLY DATA

for determining hourly capacity of heater and storage tank capacity

TABLE I
(All Figures based on heating water 100°)

Column No.	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BUILDING TYPE	MAX. POSSIBLE HOT WATER CONSUMPTION-GAL. PER HR.											MAX. HOURLY DEMAND	AVE. DAILY HOT WATER CONSUMPTION	
	Bath tub	Dish Washer	Foot Basin	Kitchen Sink	Laundry Stat. tub	Laundry Rot. tub	Pantry Sink	Private Wash Basin	Public Wash Basin	Shower	Slop Sink	Multiply max. possible cons. by this factor if water max. hourly demand	Multiply max. hourly demand by this factor to obtain ave. daily consumption	
Apartment	15	15	3	10	25	75	10	3	5	60	20	0.20	10	4
Dormitory	30	—	3	—	35	100	—	3	10	200	15	0.25	10	4
Gymnasium	30	—	12	—	—	—	—	3	10	200	—	0.60	*	*
Hotel	20	30	3	20	35	150	20	3	10	75	30	0.30	15	10
Industrial Plant	30	30	12	20	—	—	—	3	15	200	20	0.70	*	*
Loft Building	—	—	—	—	—	—	—	3	10	150	20	0.20	7.5	3
Office Building	—	—	—	—	—	—	—	3	8	—	15	0.15	7.5	3
Residence	15	15	3	10	25	75	10	3	—	50	15	0.30	10	4
Y. M. C. A.	30	30	12	20	30	100	20	3	10	200	20	0.30	*	*

Restaurant	Hand Dishwashing	Machine Dishwashing		
– All Day	Per $0.50 Meal – 1.0 Gal.	1.5 Gal	15	10
– Two Meals	Per $1.00 Meal – 1.5 Gal.	2.5 Gal	10	4
– One Meal	Per $1.50 Meal – 2.0 Gal.	4.5 Gal.	5	3
Hospital	80-100 gal. per day per bed			
Garage	50 gal. of 90° water per car washed			

* Must be determined separately for each case.

Example: An apartment house contains 47 apartments. In each of these there is a bath, washbasin, kitchen sink, and dishwasher. To determine (1) the maximum hourly demand, (2) average daily hot water consumption, (3) capacity of an indirect heater, and (4) capacity of storage tank.

Solution: (1) To find maximum hourly demand, gal. (Using Table I)

Baths [15 (from Col. 2) x 47]	—	705
Wash Basins [3 (from Col. 9) x 47]	—	141
Kitchen Sinks [10 (from Col. 5) x 47]	—	470
Dish Washers [15 (from Col. 3) x 47]	—	705
		2021

This is maximum possible hourly consumption in gallons and to find maximum hourly demand multiply 2021 by factor 0.20 found in Col. 13 and get 404 gal.

(2) To find average daily consumption, multiply maximum hourly demand, just found, by the factor in Col. 14 (10 in this case) and get 4040 gal.

(3) To find hourly capacity of heater, assume an average installation and from Table II find that 7½% of average daily consumption is suitable.[1] Hourly capacity of the heater is 4040 x 7½% or 303 gal.

(4) To find capacity of storage tank, apply equation (1):[1] From Col. 15, length of the peak demand is 4 hr. and maximum hourly demand from (1) above is 404 gal. Then, tank capacity = 4(404—303)4/9 = 539 gal.

Dimensions for a suitable tank may be selected from Table III.[1]

TABLE II. HOURLY HEATER CAPACITY
(From Average Daily Hot Water Consumption)

Type of Installation	Indirect coil in boiler unit operated nearly continuously	Direct-fired water heater with heating unit operated intermittently
Minimum	5%	10%
Average	7½%	15%
Generous	10%	20%

[1] See explanation on other side.

HOT WATER SUPPLY DATA

for determining hourly capacity of heater and storage tank capacity

Systems for providing hot water for services and fixtures in buildings are of two kinds—(1) instantaneous, and (2) storage. In the instantaneous system, the water is heated as used, there is no storage, and the capacity of the heater is equal to the peak demand. In the storage system, hot water is heated continuously or intermittently as desired. When there is no demand the heated water is stored in a tank. For installations of equal hot water capacity, the capacity of the heater in a storage system is less than that of an instantaneous heater.

The hourly capacity of the heater in a storage system may range all the way from the minimum, where it is just equal to 1/24 of the average daily hot water consumption, up to an instantaneous heater, with a capacity equal to the actual peak demand. In the first case the storage tank would be of maximum capacity while in the second no storage would be needed. In between these two extremes, any number of combinations is possible. Generally, however, for most building purposes it is more economical to install a small capacity heater and a large tank rather than a large heater and a small tank, because storage capacity costs less than heater capacity.

For the most economical installation, therefore, the general rule would be to use a small heater in combination with a large tank. This rule fixes the minimum hourly heater capacity at 1/24 the average daily hot water consumption. In practice, though, the capacity has to be slightly larger in order to provide for radiation losses. The minimum heater with an hourly capacity of 5% of the average daily consumption may be used where this consumption may be accurately predicted and where it does not vary greatly from day to day. For average installations where the daily consumption and the peak demand may vary slightly from day to day, and where they can be predicted with reasonable accuracy, a heater having an hourly capacity of 7½% of the average daily hot water consumption should be used. In buildings where the daily fluctuations may be great, where there is extraordinary uncertainty as to daily consumption, or where a considerable amount of hot water may be wasted, the heater should have an hourly capacity of 10% of the average daily consumption.

These figures are said not to be satisfactory for multi-coil heaters. Where this type heater is used, a workable rule is to provide double the heater capacity indicated by the above percentages. Table II summarizes the above data for determining the heater capacity.

There are a number of methods of selecting the capacity of the storage tank. Perhaps the best is to plot a load curve based on actual metering of the hot water requirements. A horizontal line representing the heater capacity is drawn on the curve and the areas above this line studied to determine the correct capacity of a tank to supply the extra demand of the peak periods. Storage should be provided to take care of all reasonable peak loads. Additional capacity should be allowed in the cases where two or more peaks come close together and sufficient time does not elapse for the heater to warm up the tank water. In order to prevent the incoming water from lowering the temperature of the tank water too much, the capacity obtained by the above calculations should be increased by 1/3.

Where it is not possible to plot a demand curve the following rule may be used.

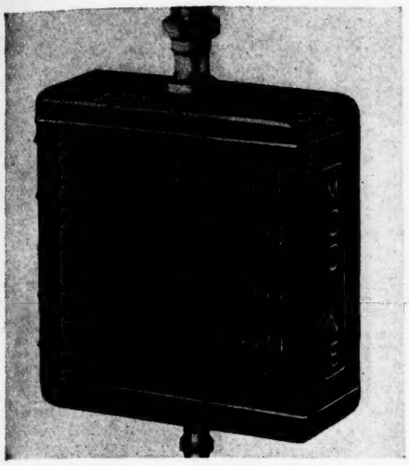
Tank Capacity, gal. = Length of Peak Demand, in hr. x (Max. Hourly Demand, gal. — Hourly Heater Capacity, gal.) 4/3 [Equation I]

Data to estimate the various quantities necessary to establish heater capacity and storage tank size are included in Tables I and II. Proceed as in example.

TABLE III. CAPACITY OF STORAGE TANKS

Diam. In.	Capacity Gal.	Diam. In.	Capacity Gal.
Number of Gal. per Ft. of Length			
18	13.2	42	72.0
20	16.3	48	94.0
24	23.5	54	119.0
30	36.7	60	146.9
36	52.3	66	177.7

NEW EQUIPMENT



Small size, Modine unit

Modine Unit Heaters

Modine Manufacturing Co., Racine, Wis., is marketing a new line of unit heaters. The feature of the new line is the arrangement of the condenser tubes to take care of unequal expansion and contraction. After each tube passes vertically through the condenser, the tube bends and extends horizontally into the bottom tank. Since each tube has its own expansion bend it can expand or contract independently of similar actions in adjacent tubes.

The condenser tubes are heavy gauge seamless red brass, ⅜ in. in diameter. The copper fins are metallically bonded to the tubes. No gaskets or screw joints are used, the condensers being welded and brazed.

The heaters are available in 11 models, ranging from one designed for very small offices or residential recreation rooms up to a twin model with a capacity of 2015 equivalent square feet of radiator.

Kennedy Fig. 45 Valve

The Kennedy Valve Manufacturing Co., Elmira, N. Y., announces a line of rising-stem, heavy standard, bronze gate valves for 150 lb. steam pressure and 250 lb. water, oil, or gas pressure. This valve, known as Fig. 45, is a companion type to the Fig. 23. The operating mechanism employs solid wedge discs, with no small quick-wearing parts.

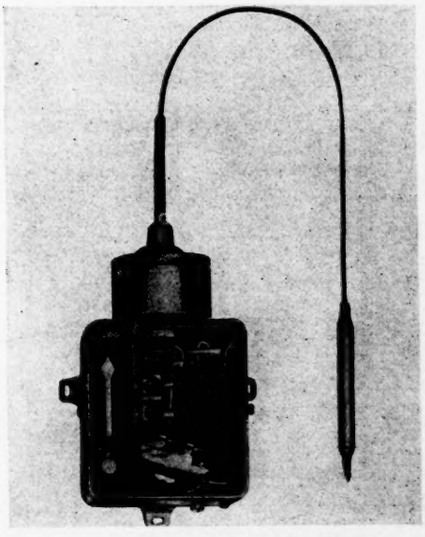
A flexible connection is provided between the disc and the stem so that the stem will not bind or spring when the valve is closed. The stem is made of a bronze composition and has a large number of contact threads in the bonnet. The bonnet hexagon has been made extra large and close to the body so that when a wrench is applied there will be no danger of distorting the bonnet.

Minneapolis-Honeywell Compensated Humidity Control

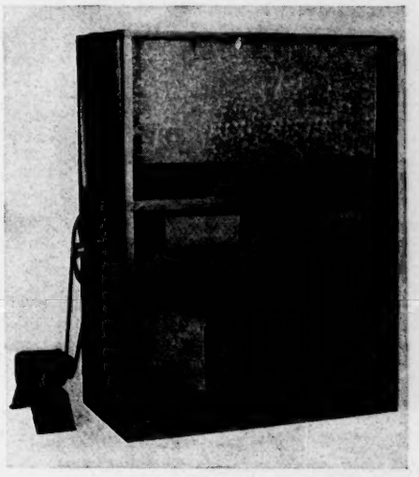
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., is prepared to supply a compensated humidity control system which is claimed to govern accurately the relative humidity at any desired differential between inside relative humidity and outside temperature. With this instrument variable factors in building construction, such as insulation and storm sash, are compensated for. At the same time, relative humidity may be maintained at the highest point desirable.

The device consists of two instruments, a modulating or potentiometer type humidity controller operating in conjunction with an outside temperature controller of remote bulb type.

The humidity controller operates in normal fashion, governing the supply of moisture at the desired relative humidity in accordance with the setting of the controller. The normal functions are performed until the outside temperature begins to drop. As it drops, the remote bulb temperature controller, the bulb of which is outdoors, through its electrical connection with the humidity controller, acts as a limit control. In other words, as the outside temperature goes down the temperature controller affects the operation of the humidity controller, causing it to call for less moisture and thereby preventing a condition of over-humidity with resultant condensation or frost on the windows and outside walls.



M-H compensated humidity control



Indirect unit for air conditioning

Dail Indirect Conditioning Unit

Dail Steel Products Co., Lansing, Mich., has designed an indirect unit for air conditioning in connection with steam or hot water systems. An extended surface heating coil is provided in the top of the unit which is connected to the boiler. A cooling coil is placed at an angle below the heating coil. The blowers are mounted in the middle of the unit, below which is a humidifying or filtering chamber. The filters are of glass or steel wool throw-away type.

The unit is completely enclosed and finished in a casing with a black ripple finish and silver corner strips. They are built in three sizes, each with various capacities and with various functions.

Minneapolis-Honeywell Stokerswitch

Minneapolis-Honeywell Regulator Co., Minneapolis, has improved its Stokerswitch, a control for keeping stoker fires alive in mild weather when calls for heat from the thermostat are infrequent. The switch is stack-mounted and operates on stack temperature.

Previous models of the control became erratic under excessive stack temperatures. The new model has a high-temperature cut-off feature which automatically breaks the circuit to the stoker motor when the element temperature reaches 850°.

The high-temperature cut-off feature also promotes the efficiency of the installation. By shutting down the stoker for brief periods when the stack temperatures are high, more even firing is insured, and stack losses are materially reduced.

These units also incorporate other

decided improvements in construction over previous models. The special design of the bimetallic helix permits them to operate over the wide range of temperature to which Stokerswitches are necessarily subjected during various seasons, and the redesigned mechanism eliminates need for strain releases as the element and operating cam are free at all times

Dumore Motor with Built-in Speed Reducer

The Dumore Co., Racine, Wis., announces a motor with built-in speed reducer, the Type K3-M 1/7 hp. The motor is equipped with a sturdy single gear reduction unit, capable of carrying the full power of the motor. It is of the universal type, operating on either direct or alternating current.

Three gear ratios can be supplied from stock—5:1, 14½:1, and 34:1, giving shaft speeds of 1300, 448, and 191 r.p.m., respectively.

Cool-Rite Unit Coolers

Cool-Rite Products Corp., 79 Willow St., New Haven, Conn., is building Cool-Rite suspended unit coolers equipped with humidity reservoirs and available in eight sizes with capacities ranging from 2160 to 16,200 B.t.u. per hr.

Marsh No. 17 Drip Trap

Jas. P. Marsh Corp., Chicago, has developed the No. 17 drip trap, designed for removal of air and condensation from short steam mains, branches, or risers. Its operating characteristics are said to make it especially desirable for installation on unit ventilators, small unit heaters, or other equipment which may be subjected to freezing temperatures during periods when the heating system is not in operation.

The outlet discharge valve is water sealed at all times and the air vent is located in the trap bonnet. The thermostatic element screws directly into the trap body. Normally air is discharged through a port directly to the outlet connections of the trap.

Interior parts are of bronze and monel metal with exception of the float which is a seamless copper float tested for a working pressure of 25 lb. per sq. in.

B-22 Master Damper Regulator Motor

White Manufacturing Co., St. Paul, Minn., announces a simplified damper regulator motor known as Type B-22 Master heat regulator. The power unit of this machine is a small four pole induction motor operated at 16 volts. Although of low price, the mechanism

White damper motor

is of heavy construction, quiet in operation. A small power transformer is mounted on the outside of the housing and is equipped with a cord and plug which may be attached to any convenient socket. While the standard machine has the transformer attached, it will also be available with separate transformer of the bell ringing type.

This motor is also equipped with a basement switch by means of which the thermostat that is controlling it may be disconnected and the crank arms moved to either "off" or "on" position to facilitate firing.

Rudy Forced-Air Piping System

A simplified piping system for forced-air jobs designed to reduce installation costs and minimize frictional resistance has been announced by The Rudy Furnace Co., Dowagiac, Mich.

Known as the Rudy self-balancing loop system, the method uses an extended plenum chamber. The company has acquired ownership to certain patents previously granted and additional patent applications have been filed.

In the commonly used branch duct system, two or more trunk ducts are taken off the furnace bonnet and then reduced in area as each branch is taken off. The Rudy system uses a single continuous trunk duct of constant size, the ends of which connect to the bonnet. Branches are taken from the loop at right angles at desired points, while in the branch duct system, branches are taken off a trunk with Y branch fittings.

In using the system, the loop is run in the basement with reference to location of warm-air registers so the branches to be taken off the loop will be equalized as to length as nearly as possible. The carrying capacity of the loop is equal to the combined carrying capacity of all branches to be taken off plus 10% for safety. Either rectangular or round pipe may be used for the loop and branches can be round or rectangular without regard to the shape of the loop.

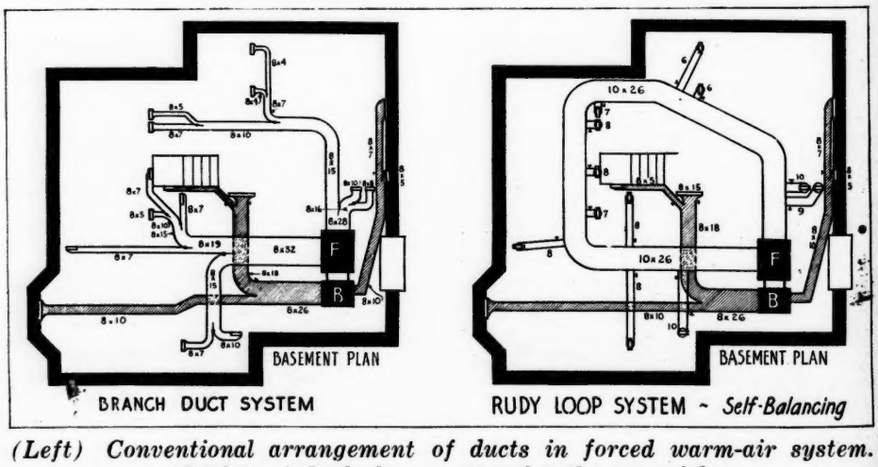
The system eliminates the use of Y-branch fittings. Openings for branches may be cut in after the loop has been erected. As pressure is maintained in the loop, the fact that more branches are taken off one half the loop than the other does not detract from the efficiency of the system.

The company has made the system available to its dealers exclusively and is now using it on virtually all forced-air jobs planned by its engineering department for its dealers.

Standard Humidostat

The Standard Humidostat, for operating air conditioning equipment, involving accurate control of relative humidity, is being marketed by The Standard Engineering Works, 289 North Main St., Pawtucket, R. I. A hygroscopic element expands and contracts with the change of relative humidity and through a simple leverage operates a mercury switch which is connected to the humidifier, dehumidifier, fan, blower, or solenoid valve.

The company's Model 32 Humidostat is of the wall type finished in walnut and is 2¾ in. wide, 5¼ in. high, and 1¾ in. deep. An adjustment for setting the control at any required relative humidity is provided on the side of the unit.



(Left) Conventional arrangement of ducts in forced warm-air system. (Right) A Rudy loop system for the same job.

Especially made for COOLING COILS

For cooling coils in modern ventilating and air conditioning systems, soundness and dependability of the pipe are highly important. To minimize losses of material in the coiling and bending operations, with attendant loss of time and labor, and to be sure of a sound, tight, workmanlike job when the installation is complete, be sure to specify NATIONAL Pipe for Ammonia Purposes. NATIONAL Pipe for this type of installation is not an ordinary product, but is a specially made and specially tested material that promises long, efficient, uninterrupted service. Behind the manufacture of this special, strong, ductile pipe are the experience, skill, and facilities of the largest manufacturer of tubular products in the world—an organization that has known intimately for years the requirements of this exacting use. Approval of ice-machine manufacturers, consulting engineers, and leading heating and ventilating engineers the country over has made it—

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY • Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL PIPE
FOR AMMONIA PURPOSES

Degree-Days and Unit Fuel Consumption—September, 1934

Beginning HEATING AND VENTILATING'S seventh year of publishing degree-day data for various large cities in the United States

	Atlanta	Baltimore	Birmingham	Boston	Buffalo	Chicago	Cincinnati	Cleveland
Degree-days for Sept., 1934	—	2	—	53	77	90	28	57
Degree-days for Sept., 1933	—	8	—	55	91	39	8	38
Degree-days for Sept., Normal	—	—	—	48	75	3	—	27
Lb. coal per sq. ft. rad., Sept., 1934	—	0.016	—	0.424	0.616	0.720	0.224	0.456
Gal. oil per sq. ft. rad., Sept., 1934	—	0.001	—	0.036	0.053	0.062	0.019	0.039
Cu. ft. gas per sq. ft. rad., Sept., 1934	—	0.19	—	5.09	7.39	8.64	2.69	5.47

	Dallas	Davenport	Denver	Des Moines	Detroit	Duluth	Fort Wayne	Grand Rapids
Degree-days for Sept., 1934	1	114	185	168	76	367	83	96
Degree-days for Sept., 1933	—	33	50	47	63	170	50	64
Degree-days for Sept., Normal	—	—	72	—	42	261	—	57
Lb. coal per sq. ft. rad., Sept., 1934	0.008	0.912	1.480	1.344	0.608	2.936	0.664	0.768
Gal. oil per sq. ft. rad., Sept., 1934	0.001	0.078	0.127	0.115	0.052	0.252	0.060	0.066
Cu. ft. gas per sq. ft. rad., Sept., 1934	0.10	10.94	17.76	16.13	7.30	35.23	7.97	9.22

	Harrisburg	Hartford	Indianapolis	Kansas City	La Crosse	Los Angeles	Louisville	Memphis
Degree-days for Sept., 1934	29	38	68	98	199	4	21	11
Degree-days for Sept., 1933	41	70	7	13	86	35	1	—
Degree-days for Sept., Normal	—	48	—	—	96	—	—	—
Lb. coal per sq. ft. rad., Sept., 1934	0.232	0.304	0.544	0.784	1.592	0.032	0.168	0.088
Gal. oil per sq. ft. rad., Sept., 1934	0.020	0.026	0.047	0 067	0.136	0.003	0.014	0.008
Cu. ft. gas per sq. ft. rad., Sept., 1934	2.78	3.65	6.53	9.41	19.10	0.38	2.02	1.06

	Milwaukee	Minneapolis	New Haven	New Orleans	New York	Omaha	Peoria	Philadelphia
Degree-days for Sept., 1934	143	247	34	—	16	152	108	8
Degree-days for Sept., 1933	43	60	51	—	31	43	21	19
Degree-days for Sept., Normal	84	93	39	—	—	—	3	—
Lb. coal per sq. ft. rad., Sept., 1934	1.144	1.976	0.272	—	0.128	1.216	0.864	0.064
Gal. oil per sq. ft. rad., Sept., 1934	0.098	0.169	0.023	—	0.011	0.104	0.074	0.005
Cu. ft. gas per sq. ft. rad., Sept., 1934	13.73	23.71	3.26	—	1.54	14.59	10.37	0.77

	Pittsburgh	Portland, Ore.	Providence	Reading	Rochester	St. Louis	Salt Lake City	San Francisco
Degree-days for Sept., 1934	42	115	32	36	65	60	145	90
Degree-days for Sept., 1933	20	167	66	44	96	1	46	122
Degree-days for Sept., Normal	—	105	63	—	72	—	18	114
Lb. coal per sq. ft. rad., Sept., 1934	0.336	0.920	0.256	0.288	0.520	0.480	1.160	0.720
Gal. oil per sq. ft. rad., Sept., 1934	0.029	0.079	0.022	0.025	0.045	0.041	0.099	0.062
Cu. ft. gas per sq. ft. rad., Sept., 1934	4.03	11.04	3.07	3.46	6.24	5.76	13.92	8.64

	Scranton	Seattle	Spokane	Syracuse	Toledo	Trenton	Washington, D. C.	Wichita
Degree-days for Sept., 1934	57	180	262	53	72	27	6	85
Degree-days for Sept., 1933	95	222	252	93	51	31	10	9
Degree-days for Sept., Normal	60	192	192	96	9	—	—	—
Lb. coal per sq. ft. rad., Sept., 1934	0.456	1.440	2.096	0.424	0.576	0.216	0.048	0.680
Gal. oil per sq. ft. rad., Sept., 1934	0.039	0.123	0.180	0.036	0.049	0.019	0.004	0.058
Cu. ft. gas per sq. ft. rad., Sept., 1934	5.47	17.28	25.15	5.09	6.91	2.59	0.58	8.16

Fuel consumption figures given above are based on certain conditions, and for other conditions corrections must be made. The figures assume the use of steam radiators emitting 240 B.t.u. per sq. ft. per hr., a system operating at 100% efficiency, and radiators calculated for maintaining 70° in zero weather. Heating values assumed for the fuels are 12,000 B.t.u. per lb. for coal, 1000 B.t.u. per cu. ft. for gas, and 140,000 B.t.u. per gal. for oil. To correct for other heating values, efficiencies, and design conditions, follow the method explained in the "Heating and Ventilating Degree-Day Handbook."

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Reinhard & Hofmeister

CONSULTING ENGINEER
Clyde R. Place

VENTILATING & AIR CONDITIONING CONTRACTORS
Almirall & Co.
Baker, Smith & Company
Carrier Engineering Corporation
Gillis & Geoghegan, Inc.
Wolff & Munier

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AMERICAN AIR FILTERS *again* SELECTED FOR ROCKEFELLER CENTER

American Air Filter Installations In ROCKEFELLER CENTER

Bldgs. No. 1 and No. 9
American Multi-Panel . . . 199,350 C.F.M.

Bldg. No. 2 (French Bldg.)
American Multi-Panel . . . . 42,500 C.F.M.
American Renu-Vent . . . . . 60,000 C.F.M.

Bldg. No. 3 (British Bldg.)
American Multi-Panel . . . . 26,000 C.F.M.

Bldg. No. 8
American Airmat . . . . . 150,000 C.F.M.

Bldg. No. 10
American Airmat . . . . . 303,000 C.F.M.
American Multi-Panel . . . . . 5,300 C.F.M.

Bldgs. No. 4A, 4B and 6
American Multi-Panel . . . 178,300 C.F.M.
American Renu-Vent . . . . . 96,300 C.F.M.

TOTAL CAPACITY AMERICAN AIR FILTERS
. . . . . 1,060,750 C.F.M.

● The most recent additions to Rockefeller Center, buildings 4A, 4B and 6 of the International Group now under construction are to have American Air Filters as an integral part of their ventilating and air conditioning systems.

This is the ninth installation of American Air Filters in Rockefeller Center, bringing the total capacity up to 1,060,750 C.F.M. These installations include MULTI-PANEL, AIRMAT and RENU-VENT filters—each type selected for the particular service to which it is best suited. American Air Filters, because of their dependability, efficiency and over-all economy are the choice of experienced engineers wherever a product proved by years of service is required.

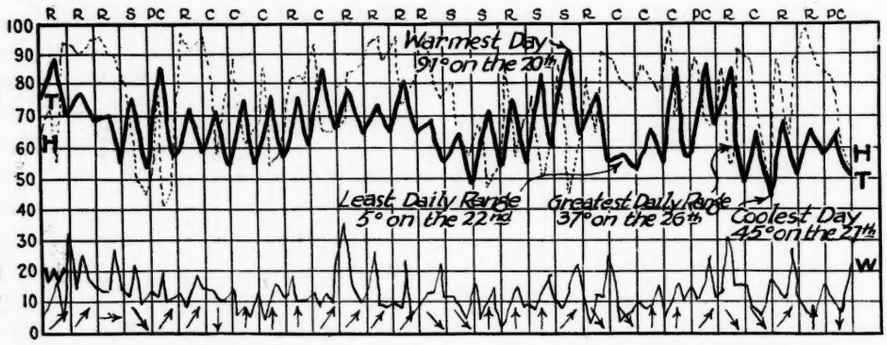
AMERICAN AIR FILTER COMPANY, *Inc.*
118 Central Avenue **Louisville, Kentucky**
In Canada, DARLING BROTHERS, LIMITED, Montreal, P. Q.

NRA MEMBER U.S. WE DO OUR PART

AMERICAN AIR FILTERS

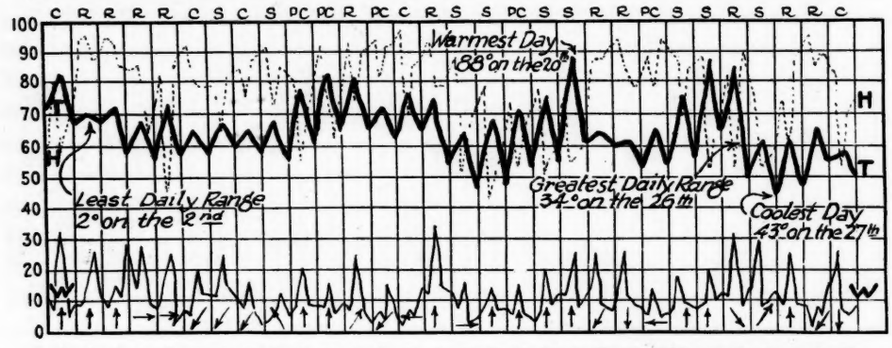
THE WEATHER FOR SEPTEMBER, 1934

Plotted from records especially compiled for HEATING AND VENTILATING by the U. S. Weather Bureau. Heavy curves (T), temperatures in deg. F.; dotted lines (H), per cent relative humidity, from readings at 8 a.m., noon, and 8 p.m., except for New York, which shows hourly readings. Light lines (W), wind velocity in m.p.h. Arrows indicate prevailing wind directions. S—clear; PC—partly cloudy; C—cloudy; R—rain; Sn—snow.



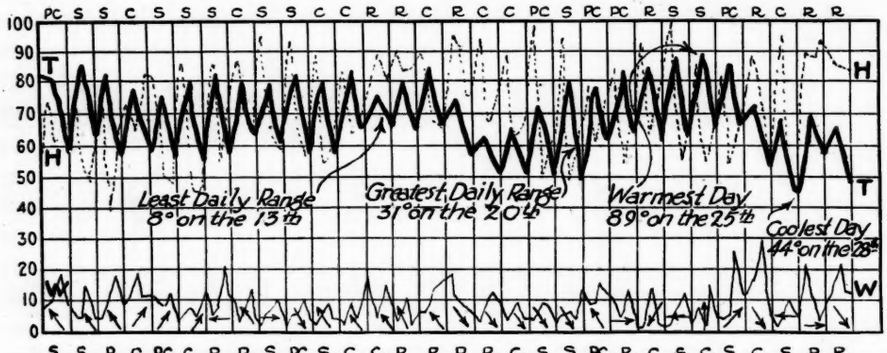
St. Louis

Mean temp. for month, 66.6°; aver. wind velocity, 11.1 m.p.h.; prevailing direction of wind, S.



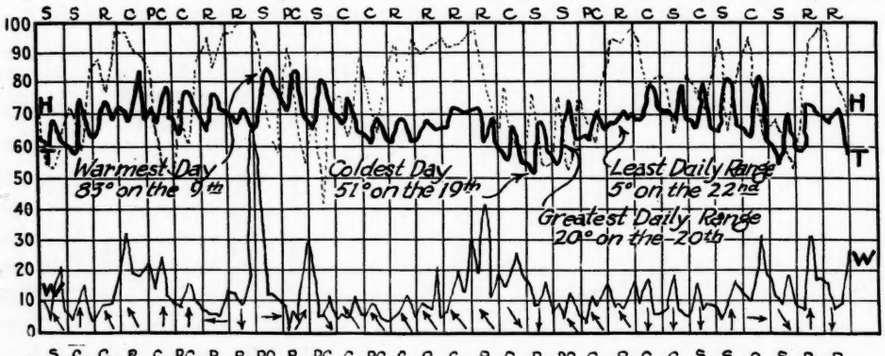
Chicago

Mean temp. for month, 64.2°; aver. wind velocity, 9.3 m.p.h.; prevailing direction of wind, S.



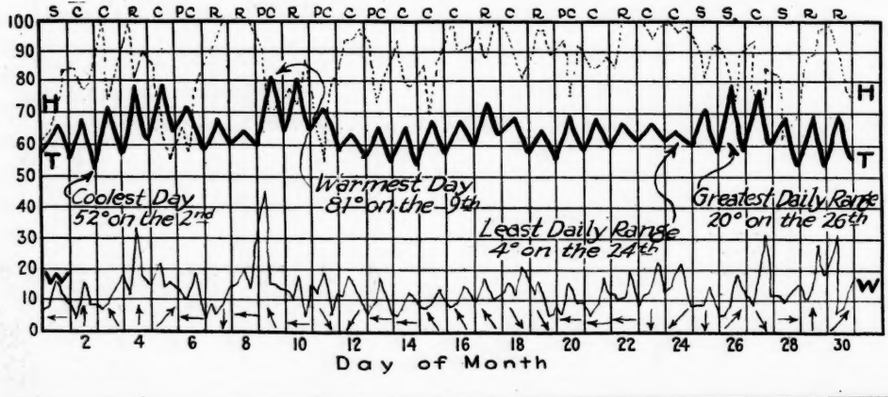
Pittsburgh

Mean temp. for month, 68.4°; aver. wind velocity, 7.4 m.p.h.; prevailing direction of wind, S.E.



New York

Mean temp. for month, 68.2°; aver. wind velocity, 10.7 m.p.h.; prevailing direction of wind, E.

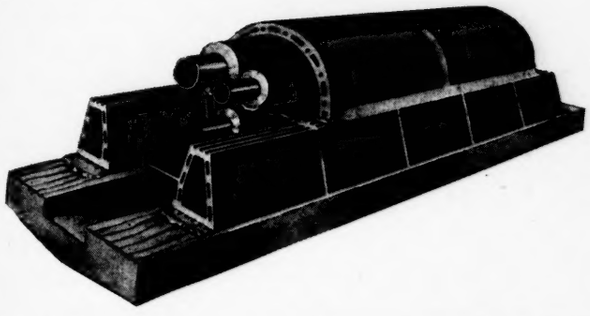

Coolest Day
52° on the 2nd
Warmest Day
81° on the 9th
Least Daily Range
4° on the 24th
Greatest Daily Range
20° on the 26th
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Day of Month

Boston

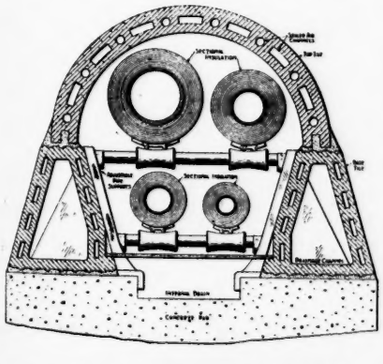
Mean temp. for month, 64.6°; aver. wind velocity, 11.7 m.p.h.; prevailing direction of wind, E.

10 POINTS *for* THERM-O-TILE

The complete Steam Conduit System for permanently housing—supporting—insulating—underground mains of central heating plants.



1—High efficiency with either sectional pipe covering or waterproof filler for insulation.
2—Less excavation.
3—Tile not required on job until after pipe is installed and tested—work on installation can be started immediately.
4—Pipe supported on solid concrete foundations—no interference of tile, no danger of tile breakage.
5—Internal drains in concrete base prevent accumulation of water from steam leaks or seepage.
6—Internal drains connected through manholes permit easy inspection.
7—Arch construction of conduit permits greater loads on top than with round tile.
8—No bell joints in tile construction—permitting conduit to be waterproofed with membrane waterproofing.
9—Trapezoidal base tiles in 5 heights—twenty different cross sections with only 5 sizes of top tiles.
10—Repairs to steam line easily made by removing top and side tiles at point of repair.



CROSS SECTION ASSEMBLY

An illustrated circular on request.

Complete Installations Made.

H. W. PORTER & CO., Inc.

NEWARK, NEW JERSEY

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COOLING

IN

AEROFIN

Comprehensive information for architects and engineers in handling cooling problems is now available in our new bulletin describing Aerofin Standardized Light Weight Fan System Cooling Surface.

Send for your copy today. Ask for Aerofin Cooling Bulletin DE-34. Address Main Office Newark or any branch office or Aerofin Distributor.

AEROFIN CORPORATION

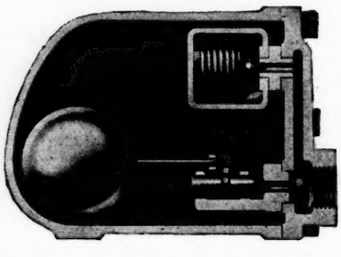
NEWARK, N. J.

The Sikorsky Aviation Corp., Bridgeport, Conn., write "installing Sarco Float Traps resulted in an approximate saving of 10% of our oil cost."

By substituting Sarco Float and Thermostatic Traps for traps previously used on 15 unit heaters, they saved about $600.00 a year in fuel bills.

SARCO

FLOAT AND THERMOSTATIC STEAM TRAPS



will handle condensate in large quantities and in sudden rushes, such as you get in unit heaters, steam coils, hot water service tanks, etc. They can be screwed into the piping without platforms or supports. The thermostatic by-pass valve removes air automatically without loss of steam. Valve head and renewable seat on high pressure types are stainless steel and will not score or wire draw. All working parts mounted on cover for ready access. Write for Catalog P-38.

SARCO CO., Inc.
183 Madison Ave. New York, N. Y.
Branches in Principal Cities
Sarco Canada Limited
Federal Bldg., Toronto, Ont., Canada

Mail Order Competition Stiffens

(Concluded from page 41)

order for the use of the easy payment plan. Ten per cent cash deposit is required when the order is placed, and the balance in from 6 to 18 equal monthly payments, depending upon the amount of the order. Purchases over $300 are payable in 18 equal monthly installments.

The retail stores' divisions of the companies are undoubtedly responsible for a large portion of their heating business.[3] In the past year these stores have become extremely aggressive, advertising almost daily in local papers. Sears had 382 of these stores December 31, 1933, after closing about 75 which were not paying. Montgomery Ward had 493 stores, last January 31.[4]

Practically all of the retail stores sell and arrange for the installation of heating equipment. The prices are, in general, higher than catalog prices, but this does not hamper sales because of the convenience and lack of

CATALOG PRICES

	Sears	Ward
18 in. firepot, piped, cast-iron, warm-air furnace, round casing	$ 35 to $ 46	$34 to $42
22 in., ditto	55 to 69	54 to 64
20½-in grate, piped warm-air steel furnace, square casing	109 to 116	—
Ditto, round casing	83 and 88	$ 82
Round steam boiler, unjacketed, 20-in. grate	$ 65	62
Square steam boiler, jacketed, 2.9 sq. ft. grate area	100	99
Ditto, unjacketed	87	86
Square steam boiler, jacketed, 8 sq. ft. grate area	208	205
Ditto, unjacketed	182	180
Console type convector-radiator, 3 sq. ft. per section, per section	0.96	—
Cast-iron radiators, 36 in. high, 5 tube, per sq. ft.	0.23	0.22½
Thermostat, 30-hr. clock, gravity motor	$ 19	—
Ditto, electric motor	20	$ 20
Thermostat, electric motor, 8-day clock	37	32
Filter-blower unit for furnace system	95	80
Stoker	199*	195
Oil burner	—	157
Radiator supply valve, steam, 1 in.	1.25	1.20
Black steel pipe, 1 in., cents per ft.	8¼	7½
Copper tubing, ½ in., cents per ft.	9	9

*For Soft Coal. Price is $215 for anthracite stoker.

shipping costs. Installation is usually, though not always, done by private contractors. Competitors have seized upon this point in their sales talks, claim that this leads to divided responsibility, leads to trouble when anything goes wrong with the apparatus.

Prices in the retail stores are not consistent, vary from town to town. This is due to shipping costs and amount of competition. They endeavor to undersell all competing products. Examples: Conversion oil burner installations in Chicago are $249; in Indianapolis, $269; Boston, $249 to $289; New York, $269;

[3]Which is one of the most profitable of any of the lines.

[4]In 1931, Ward's sales, all divisions, totaled $198 million, resulted in a deficit of $8.7 million. For the seven months ending August, 1934, sales were $129 million, $4.9 million profit. In 1931, Sears' sales were $347 million, profit $16 million; for 24 weeks ending July, 1934, sales were $140.6 million, profits, $6.8 million.

Cincinnati, $275. Stoker prices†, installed complete, are $235 in Chicago; in Indianapolis, $225; Boston, $275 to $300; New York, $275; Cincinnati, $270. Complete heating systems are also sold and the price including installation is extremely low. $300 was the price advertised for a complete hot water heating system of 400 sq. ft. installed in an 8-room house. In Cincinnati, oil burner-boiler unit, installed complete, sells for $490; in Boston, $500 to $600 is price quoted for same unit, depending on size of tank.

†Sears, according to rumor, sold a thousand stokers in September.

Selection, Training, and Testing of Pipe Welders

(Concluded from page 26)

we impose upon the contractor two practical and very perplexing problems.

First, discord in the ranks of the contractor's employes who soon realize they are the brains of his welding activities, and may readily assume an arbitrary position and resent supervision and instruction to the point of being discharged or quitting to become a contractor and creating additional competition. Second, the contractor may have brought home to him forcibly that he is losing money on his welding operations and discontinues using the process. And as is to be expected, he advertises that the process is to blame, and rarely will he confess to his own shortcomings. This is further aggravated when we equip him with false information as to costs.

Any program that concentrates instruction on the mechanic and excludes the contractor falls short of our requirements, and seriously interferes with our efforts to unify and dignify the process in our industry.

53.8% of Urban Residential Structures Have Central Heat

(Concluded from page 30)

in California than in any other state. As shown in the following table this state, with four others, accounts for 40.5% of stove-heated, other methods of heating, or no heating:

	Stoves, Other, or None	
California	1,060,666	14.6%
Texas	581,661	8.0
Pennsylvania	455,028	6.3
Ohio	442,136	6.1
Illinois	395,475	5.5

The highest degree of saturation of homes with central heating is in Pennsylvania, where 79.5% of the homes have central heating, closely followed by the east north central states with 71.4% centrally heated, and with the west south central states having the smallest percentage centrally heated. The following table shows these percentages by regions:

New England	60.9%
Middle Atlantic	75.9
East North Central	71.4
West North Central	58.5
South Atlantic	36.4
East South Central	14.8
West South Central	3.4
Mountain	32.5
Pacific	23.0

Announcing—

NEW DAMPER REGULATOR

Type B-22
Two Position

Type B-22 meets a definite need for an improved damper motor at a low price.

It is a new and simplified unit, of heavy and rugged construction, quiet in operation, and priced (to the trade) $13.50. The price covers *everything*—motor, attractive thermostat and all accessories.

It is powered by a small, four-pole induction motor operated at 16 volts. Small power transformer is mounted outside the housing, with approved cord and plug attachable to any light socket. Motor is equipped with basement switch. Listed as standard by Underwriters' Laboratories.

These are the barest facts — not enough for one in your position. You should fully inform yourself concerning this new development.

Write us today for details.

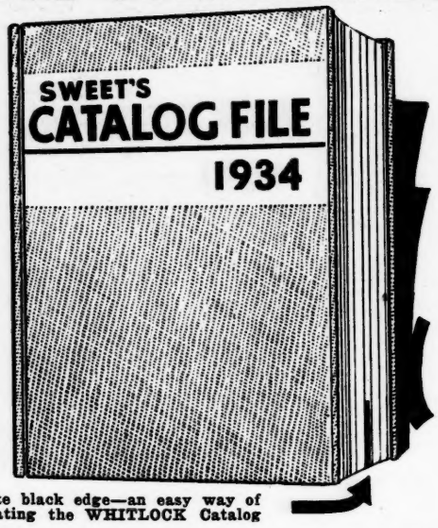
Price to Dealer $13.50

WHITE MANUFACTURING CO.
2362 University Avenue ST. PAUL, MINNESOTA

MASTER HEAT REGULATOR

For Your Convenience-Our Complete Catalog

is now in--



Note black edge—an easy way of locating the WHITLOCK Catalog

REPRINT OF THIS CATALOG IS NOW READY FOR MAILING

DROP US A CARD FOR YOUR COPY

Describes Whitlock Heat Transfer Equipment, including:—

STORAGE HEATERS, EVERDUR
STORAGE HEATERS, ETERNO
STORAGE HEATERS, STEEL SHELL
CONDENSATION COOLERS
ECONOMIZERS
CONVERTORS
INSTANTANEOUS HEATERS
FEED WATER HEATERS
FUEL OIL HEATERS
PREHEATERS, FOR RECLAIMING WASTE HEAT
HEAT EXCHANGERS
QUENCHING OIL COOLERS
SPECIAL HEAT TRANSFER EQUIPMENT
COILS, HEADERS, RECEIVERS, TANKS

THE WHITLOCK COIL PIPE CO., 40 South Street, Hartford, Conn.

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Chicago
Detroit
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Philadelphia
Amarillo, Tex.
Atlanta, Ga.
Baltimore, Md.
Buenos Aires, S. A.
Buffalo, N. Y.
Charlotte, N. C.
Cleveland, Ohio
Dallas, Tex.
Denver, Colo.
Ft. Worth, Tex.
Houston, Tex.
Indianapolis, Ind.

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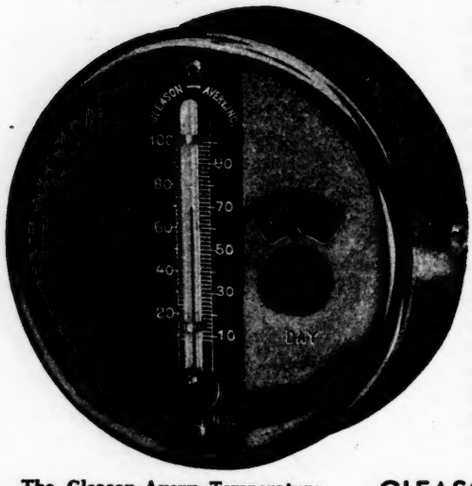
Milwaukee, Wis.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
Oklahoma City, Okla.
Omaha, Neb.
Pittsburgh, Pa.
Portland, Ore.
Rochester, N. Y.
St. Louis, Mo.
St. Paul, Minn.
Salt Lake City, Utah
San Antonio, Tex.
San Francisco, Cal.
Seattle, Wash.
Syracuse, N. Y.

In Canada, Darling Bros. Ltd., 120 Prince St., Montreal. Consult local telephone directory in cities listed for street addresses

RELIABILITY



The Gleason-Avery Temperature Regulator has proved its reliability wherever installed. It has set a standard for proper temperature control hitherto thought unattainable.

Catalogs with details of the accuracy, sensitiveness and quietness of this unit are available without any obligation.

The Gleason-Avery Temperature Regulator lists at $24.75. Dealer prices and further details will be submitted on request.

GLEASON-AVERY, Inc.
27 CLARK ST.
AUBURN NEW YORK

GLEASON-AVERY
ELECTRIC TEMPERATURE REGULATOR

AMERICAN STEEL SHEETS

FOR ALL KNOWN USES

AMERICAN SHEET AND TIN PLATE COMPANY PITTSBURGH

For Air Conditioning Systems
Heating and Sheet Metal Work

Use sheet metal products of recognized value and reputation—AMERICAN Black Sheets, Apollo Best Bloom Galvanized Sheets, Keystone Rust-Resisting Copper Steel Sheets, Galvannealed Sheets, Heavy Coated Galvanized Sheets, Tin and Terne Plates.

This Company also manufactures USS STAINLESS and Heat Resisting Steel Sheets and Light Plates for all known purposes.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

A UNIT HEATER OF NEW DESIGN . . . . . with greater structural strength

Entirely new and outstandingly advanced in design . . . made by a manufacturer who not only helped pioneer the unit heater but still is foremost in the field . . . the new Modine is the latest development for commercial and industrial heating.

In the new Modine, *cylindrical* steam passages give the copper tanks and red-brass condenser tubes a strength many times in excess of requirements. The new *expansion bend* construction, exclusively Modine, permits condenser tubes to expand *individually and differentially.* A new *bonding process* enhances heat transfer from tube to fin. New *velocity generators* direct and control the air stream. New streamline design *re-adjustable deflectors* provide vertical direction of the air stream.

These new features not only make the new Modine a better unit structurally but assure far more effective and economical distribution of heat. And the new Modine costs *you* no more.

MODINE MANUFACTURING COMPANY
1740 RACINE STREET RACINE, WISCONSIN

Write FOR FREE BOOK

The NEW MODINE

Each tube of condenser, before entering lower header, bends in a way which provides for free expansion. This parallels high